CAPTURE, RECORD AND STREAMING SOLUTIONS

epiphan SYSTEMS INC.

Lecture Recorder x2 User Guide

Version 3.12.0

May 20, 2014

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Product Feedback

Your feedback is important! We regularly contact our customers to ensure our products meet your performance and reliability requirements. We strive to continually enhance our products to accommodate your needs. Please let us know how you think we can improve our products by emailing your suggestions to **info@epiphan.com**.

Specifications

Go to the Recorders page of the Epiphan website to get the most recent product specifications and additional information about the Lecture Recorder x2.

Warranty

All Epiphan Systems products are provided with a 100% return to depot warranty for one year from the date of purchase.

Technical Support

Epiphan's products are backed by our professional support team. If you are having issues with your product, please gather details about your system and contact our team by:

- Emailing **support@epiphan.com**
- Live chat via the link on our support site **http://www.epiphan.com/support/**
- Phone toll free at 1-877-599-6581 or call +1-613-599-6581

Be sure to include as much information about your problem as possible. Including:

- Problem description
- Details of the video or audio source (type, connection, resolution, refresh rate, etc.)
- Product serial number
- Product firmware version (if applicable, from web admin interface)
- Product LED lights

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What's New in Release 3.12.0

The following features were introduced or in some cases enhanced in release 3.12.0. For a description of new and changed features in previous releases refer to Releases and Features .

New Streaming Features

RTMP live streaming

Your can now stream live video to a content delivery network using Real Time Messaging Protocol (RTMP). In addition to providing high performance streaming of audio and video, when you stream your content using RTMP, you reduce system resource usage as well as enhance your viewer's experience.

When setting your CDN, you now have a choice between streaming with RTSP announcement or RTMP push. Both RTSP and RTMP can be used for live streaming, however not all CDNs or media servers support both formats.

See Stream content using HTTP or RTSP.

SAP Announce

Your allows you to advertise your stream over a local network using SAP Announce. To use this feature, your stream must be setup to use UDP streaming. Local viewers can view the stream using a software or hardware media player. Viewers are presented with a list of available channels, similar to a television listing. Viewers need only click on a stream or channel and the video is streamed to their desktop, mobile or tablet.

See Stream content using multicast streaming.

See Add a customized background to a multi-view channel.

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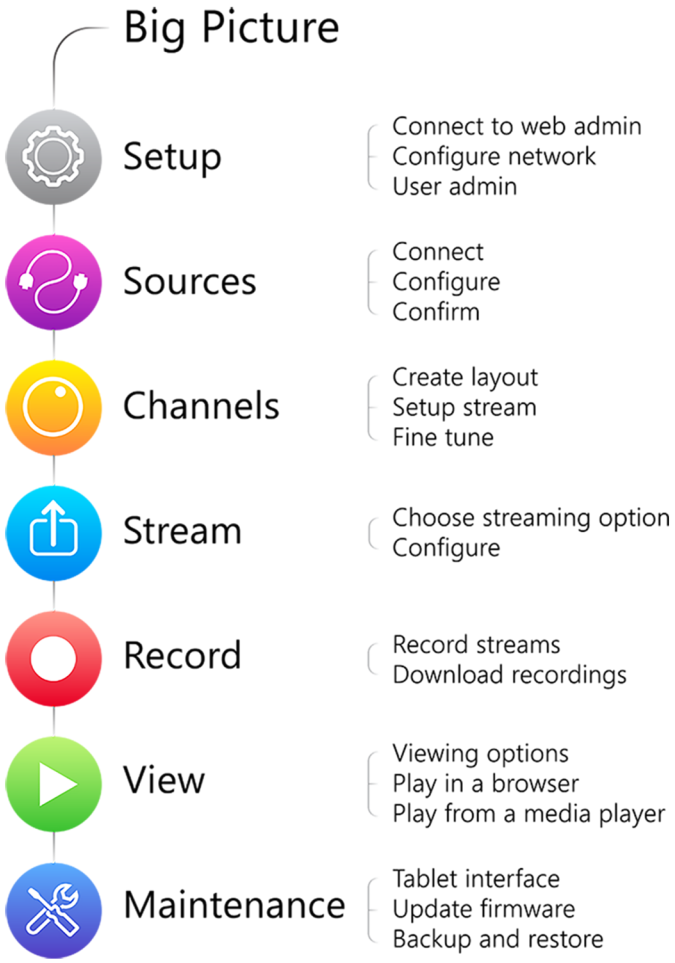
Welcome

Welcome, and thank you for buying Epiphan's Lecture Recorder x2™. This guide will help you configure your new system.

To get started, review the Lecture Recorder x2 Overview and What's in the Box? sections. Next, a Quick Start guide walks you through the basic steps to get a single video (and optional audio) source configured as a streamable, recordable output from the Lecture Recorder x2.

Following the quick start section, a set of task-based procedures help you to tweak the system exactly how you want it. These procedures are broken into seven categories: Setup, Sources, Channels , Stream, Record, View, and Maintenance.



About this Guide

Warnings are depicted as follows.

This is a warning.

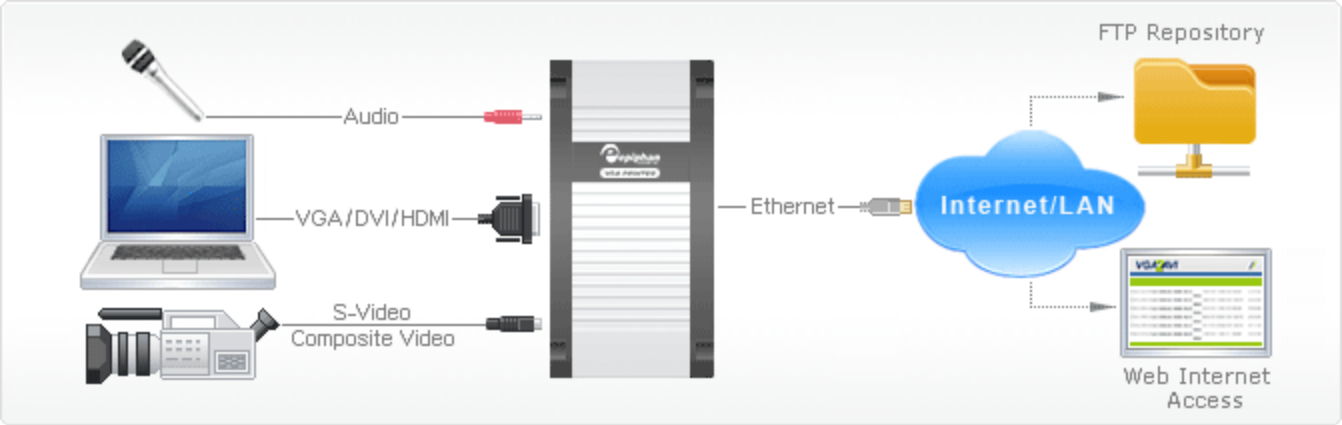
Tips and Notes are depicted as follows.

This is a tip.

Throughout this guide there are situations where more than one solution will complete a task. In those cases the guide describes the simplest or most common variation first.

Lecture Recorder x2 Overview

Lecture Recorder x2 is a small, silent, portable video recording and video streaming device that captures and streams audio, SD video sources like camera feeds, and HD video sources such as computer monitors, RADAR displays, or ultrasound machines. You can use it to capture, record, and stream one input or both inputs simultaneously as synchronized time-stamped streams or a picture-in-picture stream. The stream can be viewed a number of ways through media players, browsers, or on mobile devices. Recorded files can be downloaded via FTP or set to automatically upload via FTP, RSYNC, or CIFS.



The following table describes the storage capacity and types of inputs support by the Lecture Recorder x2.

Table 1 *Inputs and Storage specifications for Lecture Recorder x2*

Model	DVI-I (single link)	DVI-I (dual link)	S-Video	Audio	Storage
Lecture Recorder x2	1	-	1	1	16 GB

What's in the Box?

The following is included in the Lecture Recorder x2 box:

1. The Lecture Recorder x2 device
2. One "Big Red Button"
3. One VGA to DVI-I cable
4. One HDMI to DVI-I adapter
5. One DVI-I to DVI-I cable
6. One composite to S-Video cable
7. One Ethernet cable
8. One Power over Ethernet injector

Table 2 *Description of Included Cables*

Image	Name	Description
	Big Red Button	Starts and Stops recording when connected to the device.
	DVI-I Dual Link cable	Connects a DVI source to the system's DVI port(s).
	VGA to DVI cable	Connects a VGA source to the system's DVI port(s).
	HDMI to DVI adapter	Connects an HDMI source to the system's DVI port(s).
	Composite to S-Video cable	Connects a composite output from an analog sources to the system's S-Video port(s).
	RJ-45 Ethernet cable	Connects the system to your network.

Image	Name	Description
	Power over Ethernet injector	Injects power over an Ethernet cable. Used to power the device when the network connection is not powered.

Lecture Recorder x2 Overview

The Lecture Recorder x2 is suitable for setting on a desktop, shelf or podium. It's small size (202mm x 105mm x 35mm (7.95" x 4.13" x 1.38") provides the user with the flexibility of having it within arm's reach, yet remain inconspicuous. For ease of use all input connections are accessible from the front panel and LEDs are displayed on the front panel. The back panel provides connections for output devices and power.

Front Panel

This section describes the front panel connectors and indicators.

Table 3 *Lecture Recorder x2 Front Panel Descriptions*

Label	Name	Description
1	Reset button	Resets the Lecture Recorder x2 back to its factory configuration defaults. To ensure the device is not accidentally reset, a special sequence is required. See Restoring Factory Configuration.
2	Record Stop/Start toggle	Toggles the recording on/off.

Label	Name	Description
3	Status LEDs	Three LEDs on the front panel indicate the following Lecture Recorder x2 status: **Solid blue LED** indicates device is starting up or indicates a recording error during a recording session. **Solid green LED** indicates the device is ready to capture images. **Flashing green LED** indicates files are copied to an external USB drive. **Flashing blue LED** indicates: • a video signal test is in progress; • system tuning, or • Lecture Recorder x2 is recording received images. Note: If the periodic disk check function occurs during start up, it may take up to 20 minutes to power up the device. During this time the blue LED is flashes (two intermittent flashes) and the green LED flashes. See Storage Disk Maintenance for more information.
4	USB port	Connect to one of the following devices: • big red button for recording control • external HDD • USB flash drive • mouse to start and stop recording • RS-232 serial port for remote control Note: Using more than one USB device may impact system performance.
5	S-Video input	Connect to an s-Video source or a composite video source using the adapter (included).
6	DVI-I input port	Connect to one of the following sources: • DVI input, use the DVI to DVI cable (included) • VGA input, use the VGA to DVI adapter (included) • HDMI input, (for non-copy protected content), use the HDMI to DVI adapter (included)
7	Audio In	Connect to an audio input source.

Back Panel

This section describes the back panel connectors and indicators.

Table 4 *Lecture Recorder x2 Back Panel Descriptions*

Label	Name	Description
8	Audio Out	Connect to audio equipment, such as headphones or speakers, to confirm the audio stream is captured.
9	DVI Out	Connect to video equipment, such as a monitor or projector to confirm the video stream is captured. Connect one of the following sources: DVI output, use the DVI to DVI cable (included) VGA output, use the VGA to DVI cable (included) Note: This connection can convert a VGA input signal to DVI output signal. To confirm the video stream from an s-Video port, refer to Configure channels.
10	USB	Connect to one of the following devices: • big red button for recording control • external HDD • USB flash drive • mouse to start and stop recording • RS-232 serial port for remote control Note: Using more than one USB device may impact system performance.
11	RJ-45	Attach the provided RJ-45 cable and connect to a powered Ethernet port. The port is auto-sensing and supports negotiations at 10/100 speeds. Power over Ethernet is used to power Lecture Recorder x2. If the network connection does not provide power, use the provided power over Ethernet injector to power the device.

Quick Start

This section helps you get up and running quickly with your Lecture Recorder x2:

- Step 1: Physical setup and power on
- Step 2: Confirm signals from input sources
- Step 3: Admin discovery and login
- Step 4: Setup the video source
- Step 5: Configure the channel
- Step 6: Record the stream

Before you get started, make sure you have:

- an HD source (i.e. a computer, a tablet, or a phone)
- the appropriate cables or adapters to convert the output to DVI (if needed)
- optionally, an audio source such as a microphone or the headphone jack from a laptop (note that the audio signal sent over HDMI cables is not supported)
- ideally, a network with Dynamic Host Configuration Protocol (DHCP)
- a computer with a web browser connected to the same network (this is referred to as the "admin" computer in the steps below)

These instructions include steps for setting up and configuring audio. Skip these optional steps if you do not want to configure an audio source at this time.

Step 1: Physical setup and power on

Complete the following steps to prepare and power on the system. Refer to the Front and Back Panel View section for your system to locate the appropriate ports.

1. Turn on your HD source and connect the output cable to the DVI-I input port on the front of the device.
2. (optional) Attach a 3.5 mm audio cable from your audio source to the system's audio input port.
3. If your network connection provides power over Ethernet:
    a. Connect the Ethernet cable to the system.
    b. Connect the Ethernet cable to your network.

    If your network connection does not provide power over Ethernet:
    a. Connect the PoE injector into a grounded AC power source.
    b. Connect an Ethernet cable from the Ethernet switch port on your network to the RJ-45 connector (labeled In) on the PoE injector.
    c. Connect an Ethernet cable from the RJ-45 connector (labeled Out) from the PoE injector to the RJ-45 Ethernet port on the back panel of the Lecture Recorder x2.

4. Wait for the system to complete the power up sequence. The green power LED is illuminated when boot up is complete.

Step 2: Confirm signals from input sources

Once the Lecture Recorder x2 is powered up, you can confirm that signals from input sources are received by the device.

1. To ensure an input source is properly connected to the DVI input port, connect a monitor to the DVI output port on the Lecture Recorder x2.
2. View the monitor to confirm a signal is sent to the DVI input port.
3. To confirm high quality data is captured from an S-video input source, connect the source to an S-video or composite receiver, such as a TV or monitor before connecting to the Lecture Recorder x2 and confirm that a high quality signal is generated.
4. To ensure an audio signal is sent to the Lecture Recorder x2, connect a speaker or headset to the audio output port and listen to the captured audio.

Now you are ready to capture, record and stream.

Step 3: Admin discovery and login

The Lecture Recorder x2 is managed from a web interface. This interface acts as a configuration utility and system monitor. The first time you access the web interface you may not know the IP address of the device.

The steps below use DNS-based service discovery (a type of zero-configuration networking) to access the device. Depending on the operating system on your admin computer you may need to install some software before you can use DNS-based discovery.

Table 5 *Installing Bonjour Print Services*

System	Action Needed
Microsoft Windows	You must install Bonjour Print Services: 1. Use the following URL - **http://support.apple.com/kb/DL999** 2. Click Download. 3. Follow the system prompts to download and install the application.
Mac OS X	The Bonjour software used for service discovery is built into the Mac OS. No special actions are needed.
Linux	The Avahi implementation used for DNS-based discovery is shipped with most Linux distributions. If necessary, check with your administrator to ensure you have the Avahi package installed.

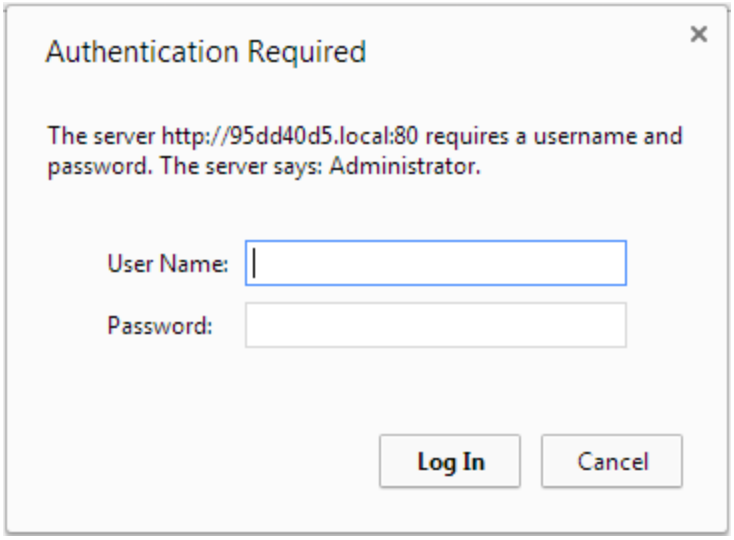
This quick start is meant for systems that support DHCP and DNS, however if your system does not support either protocol, refer to **Connect to the Admin Interface** for other discovery methods. Return here when prompted for the web interface user name and password.

You are able to access the system's web interface on the local network by specifying its serial number in a web browser on your admin computer.

1. Find the system's serial number. It is printed on a sticker on the back of the device.
2. Type the following string into the address bar of your web browser on your admin computer and press Enter. (<serial> is the serial number of your Lecture Recorder x2):

> http://<serial>.local/admin
> **For example:** http://3D24A1.local/admin

3. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in Setting and Changing User Passwords.



4. Optionally, navigate to the **Network** link under the Configuration heading and note the **IP address** of the system.

Step 4: Setup the video source

When a source device, such as a camera or tablet is connected to an input port, the Lecture Recorder x2 automatically recognizes the source and adds the source to the **Stream Setup** menu in the Web Interface.

1. From the web interface, click on the **Info** page; the info page opens displaying the live stream and the stream URL. This is the link you can share with your viewer to view the live broadcast.

Source setup is complete. The system automatically detected and adjusted the image capture settings at start up and will continue to adjust every 60 seconds during operation (interval is configurable). The system's goal is to produce the best quality captured image given the source equipment used. Generally no further configuration tweaks are needed.

Step 5: Configure the channel

Now that you confirmed the system detected your source and you are satisfied with the captured image, it's time to configure a channel to share the captured image with your streaming users and prepare the source for recording.

Review and configure the channel:

1. From the web interface, click **Stream Setup**. The Steam Setup page opens displaying configuration settings for DVI and S-Video channels.
2. No need to change anything right now. Review some of the default settings. The four most useful settings to know about are codec, frame size, frame rate and bitrate.
    a. The codec is set to H.264 by default.
    b. The frame size should reflect the resolution provided by your source. You can set it to something different by typing in the fields or selecting an option from the different sizes shown. Scaling the image (making it larger, smaller, or different aspect ratio) takes some processing power, so it's always best to leave this at the value detected by the system unless you know it is wrong or know you need to scale the size.
    c. The frame rate limit is set to 30. This means the system won't spend extra computing time to attempt to receive more than 30 frames per second. For perspective, NTSC TV signals use 24 frames per second and most hand-drawn animations show only 12 unique frames per second.
    d. The bitrate is automatically calculated based on the resolution of the input signal. Raising this value uses more system processing power and more bandwidth.

You may now optionally add audio to your channel:

3. Scroll to the bottom of the Stream Setup page and ensure the **Enable audio** checkbox is enabled (enabled by default) for the audio source to which you connected your 3.5 mm audio cable.
4. Leave the default PCM 22KHz format and audio bitrate.
5. Click **Apply**.

Your stream setup is complete. Since most of the steps are pre-configured; you are up and running with a stream very quickly. You can share the live broadcast link with your viewers on your local area network (LAN). Depending on your internet connection and upstream bandwidth, you may need to adjust the video bitrate down before sharing over the internet.

Step 6: Record the stream

The device is set up and streaming. This may be all you need, but if you like, you can also record the stream.

To record the stream:

1. From the web interface, click the red **Start** button at the top of the menu; the text at the top of the screen changes to indicate the recording is starting, then indicates the length of time since the recording started.
2. Click the black **Stop** button; the recorder stops.
3. To view the result, click **Recorded Files**; the recorded files page loads and a file list appears that displays your newly recorded stream snippet.
4. Click the file name to download and view your recording.

What's Next?

Now that you have a source setup and ready to stream, you can fine-tune the system to your exact requirements. You can look at topics such as:

- Customize your channel
- Stream your video

- File and Recording Transfer
- User Administration

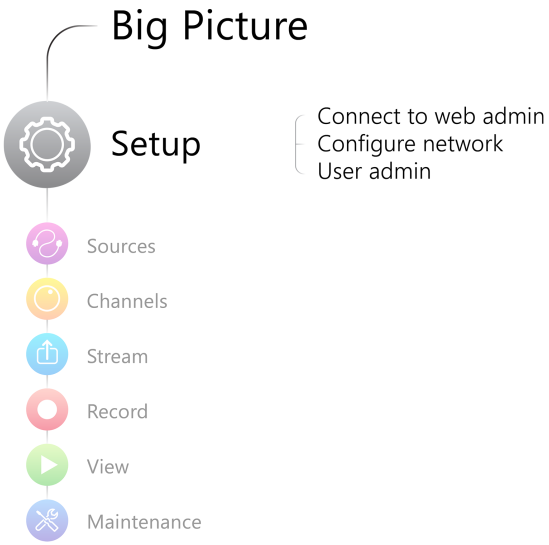
When you have completed system tuning, make sure to back up the device configuration using the procedure described in:

- Save and Restore Device Configuration

Refer to the table of contents for a complete list of the topics covered.

PART 1: Setup

If you followed through the quick start guide, you already have a basic configuration and possibly a recording of an input. Before you tweak the channel this part of the manual helps you to get your Lecture Recorder x2 properly configured for your network.



Topics covered:

- Connect to the Admin Interface
- User Administration
- Configure Network Settings
- Configure Date and Time
- Restrict Viewers by IP Address

1-1 Connect to the Admin Interface

The Lecture Recorder x2 is managed from a web interface. If you know the IP address of the device you may type it into the address bar of your web browser.

```
http://<IP Address of the Lecture Recorder x2>/admin
```

The first time you access the web interface you may not know the IP address of the device. The Lecture Recorder x2 supports a number of ways to determine the IP address.

This section covers two discovery methods that work with networks that support Dynamic Host Configuration Protocol (DHCP) and a method that works for networks that do not support DHCP.

For networks with DHCP use one of the following procedures:

- Connect via DNS-based Service Discovery
- Connect via the Epiphan Discovery Utility

For networks without DHCP, use the following procedure:

- Connect via Persistent Static IP Address

You can also connect to a reduced Operator tablet interface. See **Connect to the tablet interface**

Connect via DNS-based Service Discovery

The Lecture Recorder x2 uses DNS-based messages to advertise details about itself, including its domain name. With a compatible utility installed on your computer, you can access the device simply by typing its serial number and the suffix ".local" into the address bar of your browser.

To ensure you have compatible software, refer to the following table.

Table 6 *Installing Bonjour Print Services*

System	Action Needed
Microsoft Windows	You must install Bonjour Print Services: 1. Use the following URL - **http://support.apple.com/kb/DL999** 2. Click Download. 3. Follow the system prompts to download and install the application.

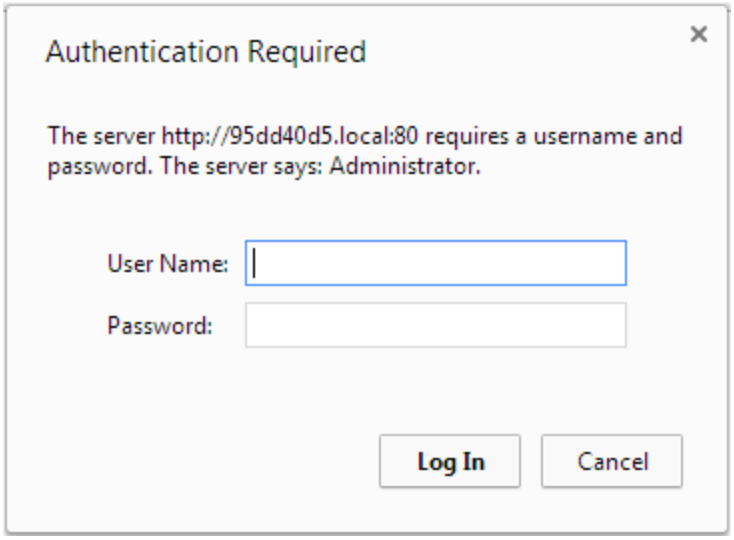
System	Action Needed
Mac OS X	The Bonjour software used for service discovery is built into the Mac OS. No special actions are needed.
Linux	The Avahi implementation used for DNS-based discovery is shipped with most Linux distributions. If necessary, check with your administrator to ensure you have the Avahi package installed.

To access the Lecture Recorder x2 web interface via DNS service discovery:

1. Find the system's serial number. It is printed on a sticker on the back of the unit.
2. Type the following string into the address bar of your web browser on your admin computer (where <serial> is the serial number of your Lecture Recorder x2):

http://<serial>.local/admin
For example: http://95dd40d5.local/admin

3. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in Setting and Changing User Passwords.



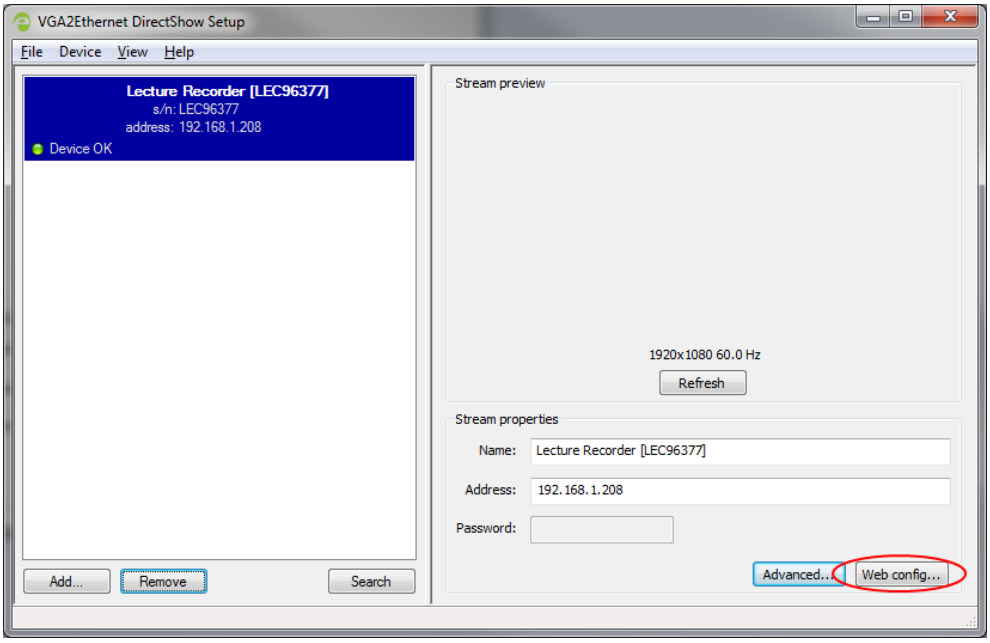
4. Optionally, navigate to the **Network** link under the Configuration heading and note the **IP address** of the system.

Connect via the Epiphan Discovery Utility

Epiphan provides a utility for discovering Epiphan devices on your network. The Epiphan network discovery utility is a 32-bit Windows executable that works on most 32-bit and 64-bit Windows operating systems. Download and install the utility via the download link on this web page: **http://www.epiphan.com/products/broadcasting/resources**.

To access the Lecture Recorder x2 web interface via the Epiphan discovery utility:

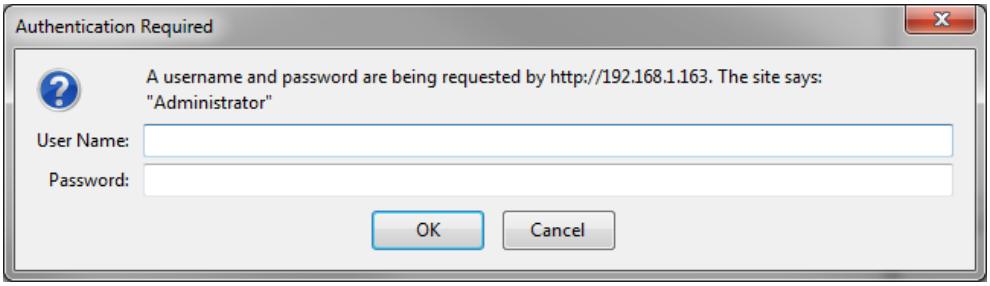
1. Launch the discovery utility.
2. Click **Search** to find all the Epiphan devices on the network; a list similar to the following appears.



3. If more than one device appears, select the one you wish to configure by matching the serial number listed with the serial number marked on the back of the device.
4. Optionally, note the **IP Address** shown in the stream properties. Use this for quicker access to the device on future configuration sessions.
5. Click the **Web config** button; your browser will open and point to the web interface page.

> http://<IP Address of the Lecture Recorder x2>/admin

6. Enter the user name and password then click **OK**. The administrative user is 'admin'. Initially no password is set. To set a password follow the procedure outlined in User Administration.



Connect via Persistent Static IP Address

This section discusses how to directly connect to the Lecture Recorder x2 using the factory default persistent network settings. Use this method if your network does not have a DHCP server or if you prefer to connect directly to the device for initial configuration.

The Lecture Recorder x2 is pre-configured with the following static address defaults:

- IP Address: 192.168.255.250
- Netmask: 255.255.255.252
- User Name: admin
- Password: your admin password (by default set to no password)

To access the Lecture Recorder x2 web interface via the persistent static IP address:

1. Record the network settings of the workstation being used to connect to the Lecture Recorder x2 so that they can be restored later.
2. Temporarily change the network configuration on the workstation to the following:
    a. Use Static IP assignment
    b. IP address: 192.168.255.249
    c. Subnet mask: 255.255.255.252
3. Establish an Ethernet connection between the Lecture Recorder x2 and the workstation by one of the following methods:
    a. Connect the device to a local Ethernet network shared with the workstation.
    b. Connect the device directly to the workstation's Ethernet port using either a regular or a crossover Ethernet cable.
4. Start a web browser on the workstation and browse to: http://192.168.255.250/admin/
5. Log in as the administrator user with the user name admin and the admin password (by default there is no password); the web interface page opens.
6. Click the **Networking** link in the Configuration menu.

7. Select the radio button to **use a static address** and configure the device with a static IP address and network settings relevant to the network being used. For specific details about the settings presented, see Configure Network Settings.
8. Restore the previously saved network configurations on the workstation.

1-2 User Administration

The Lecture Recorder x2 has three configured users:

- admin
- operator
- viewer

By default, none of these users have passwords. For security purposes you should add passwords to the admin and operator accounts.

This section describes the following user administration topics:

- Understanding User Privileges
- Setting and Changing User Passwords
- Removing User Passwords
- Overcoming Lost Passwords
- Changing the logged-in user

Understanding User Privileges

The Lecture Recorder x2 has three users: admin, operator and viewer. The user account names cannot be changed and the accounts cannot be disabled. By default, none of the accounts have passwords.

Admin

The admin account is the main operator used for all device configuration. This user has access to all options in the web interface.

Operator

The operator account is a subclass of the admin account. The operator can log in and view all configuration items but may only make changes to a small number of options. This account is intended for an operator to start and stop recordings, download recordings, or perform network diagnostics.

Viewer

The viewer account is for all end-users who are permitted to view the streamed channels. By default, when there is no password, users are not prompted for a username and password when viewing a channel. A username and password prompt appears when there is a viewer password set.

Current User

When logged in to the web interface, the current username is displayed at the top right corner of the screen.

User Privileges

The following table outlines the privileges for each user:

Table 7 *User Privileges in the Web Interface*

Action or Menu Option	viewer	operator	admin
View channel output	✓	✓	✓
Channel Operations			
View Channel Configuration		✓	✓
Configure Stream Channel			✓
Publish a Stream			✓
Configure Stream Branding			✓
Start the Stream Recorder		✓	✓
Stop the Stream Recorder		✓	✓
View Recorded Files List		✓	✓
Download Recorded Files		✓	✓
Delete Recorded Files		✓	✓
System Configuration Operations			
View System Configuration		✓	✓
Configure Automatic File Upload			✓
Select External USB Drive Behavior			✓
Configure FTP Server			✓
Configure UPnP Sharing			✓

Action or Menu Option	viewer	operator	admin
Configure Network Address			✓
Configure USB Tethering			✓
Perform Network Diagnostics		✓	✓
Configure Date and Time preferences			✓
Set or Change User Passwords			✓
Configure Serial Port Flow Control			✓
Upload Branding Images			✓
Upload Branding Templates			✓
Select Branding Template			✓
Enable Remote Support			✓
Backup Device Configuration			✓
Restore Device Configuration			✓
Restore Factory Configuration			✓
Reboot Device (via Web Interface)			✓
Configure Time Until Next Disk Check			✓
Perform Disk Check			✓
View Disk Information		✓	✓
Upgrade Firmware			✓
View System Information		✓	✓

Setting and Changing User Passwords

The Lecture Recorder x2's three static users are: admin, operator and viewer.

None of the accounts have passwords assigned by default, but since both the admin and the operator user have access to the web admin interface, you should always have a password for both admin and operator accounts. Refer to your system administrator for your organization's specific password requirements.

Passwords are case sensitive and can use all alpha-numeric keys in the ASCII range. Your password can be up to 255 characters long, but should not include any spaces.

Setting a user's password causes the user to be logged out. Be ready to log back in with the new admin password or have operators and viewers log in with the appropriate new password. Viewers may need to refresh their browser window or press play in their media player.

If you lose the admin password, refer to the section Overcoming Lost Passwords.

To set a user password:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Highlight and delete the **current password** for your selected user (the password is currently masked as dots).

   For security reasons, the current password appears as eight dots regardless of password length, and even if there is no password set.

5. Highlight and delete the **confirmation password** for the selected user.
6. Select the user's **password** field and type a new password for the user.

   The new password must have between 1-255 alpha-numeric characters or special characters with no spaces. Passwords are case sensitive.

7. Select the user's **password confirmation** field and confirm the new password.
8. Click **Apply**.
9. If you were logged in as the user whose password you just changed, you are logged out and must log back in with the new password. If you added or changed the viewer's password, all viewer's stream will pause until they log in with the new password.

If desired, you may specify multiple account passwords on the same page before clicking Apply.

Removing User Passwords

If you want to remove passwords for one or more user accounts, you may do so via the web interface. If you don't remember the admin password, refer to the section Overcoming Lost Passwords.

Clearing a user's password will cause that user to be logged out. Be ready to log back in with the new admin password. If viewers are watching the broadcast when the viewer password is cleared they will be logged out. Viewers may need to refresh their browser window or press play in their media player to trigger the login prompt.

To clear a user's password:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Highlight and delete the current password for your selected user (the password is currently masked as dots).

   For security purposes, the current password appears as eight dots regardless of password length, and even if there is no password set.

5. Highlight and delete the **confirmation password** for the selected user.
6. Click **Apply**.
7. If you were logged in as the user whose password you just cleared, you are logged out and must log back in without a password. If you cleared the viewer's password, all viewers' stream will pause until they log in without a password.

Overcoming Lost Passwords

If you have lost the password for the operator or viewer account, you can log in to the web interface as admin and reset the password using the procedure described in Setting and Changing User Passwords.

If you have lost the admin password you will need to reset the device to factory defaults, which resets to the default blank admin password. See Restoring Factory Configuration.

After resetting to factory defaults, you can restore a configuration file with your known good configuration. Remember to set user passwords after loading a configuration. Passwords are not saved in the configuration file. See Save and Restore Device Configuration.

Changing the logged-in user

When you log in to the web interface as admin or operator, your browser remembers this configuration and automatically logs you in as the same user when you go back to the site.

Sometimes you need to change from operator to admin, or vice versa.

To change the logged-in user:

1. Exit your browser completely, or open a different browser (i.e. Internet Explorer, Chrome, and Safari are different browsers).
2. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
3. You are prompted for a username and password.

1-3 Configure Network Settings

By default the Lecture Recorder x2 uses DHCP to obtain an IP Address via an Ethernet-based network. If you want to change the network settings, or if you're having network-related issues, this section covers the following related topics:

- Verify IP Address and MAC address
- Configure a Static IP Address
- Configure DHCP
- Tether to a Mobile Network
- Perform Network Diagnostics

Verify IP Address and MAC address

The web interface shows you the device's MAC address and current IP Address via the Network configuration page.

To view settings on network configuration page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Note the **MAC address** and **Current IP address** listed at the top of the page.

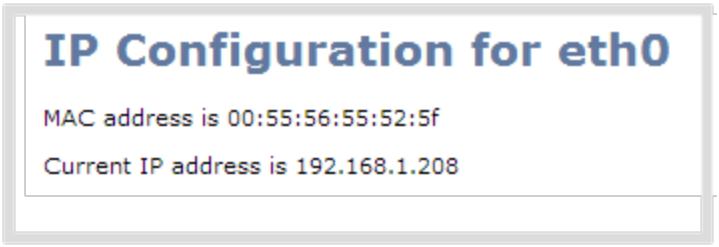


Table 8 *Network Information Fields*

Label	Description/Options
MAC Address	A media access control address (MAC address) is a unique identifier for the network interface. The value is read-only and cannot be changed. You may need to share this value with your system administrator.

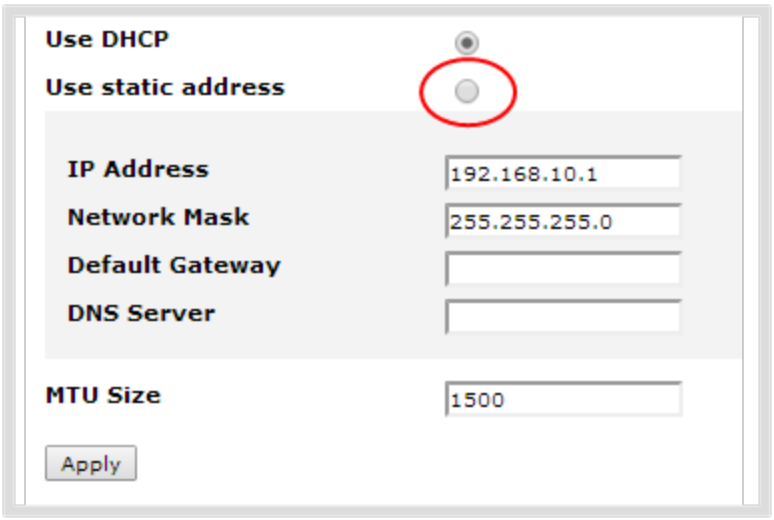
Label	Description/Options
Current IP Address	Reflects the current internet protocol address (IP address) of the system. This value is either obtained from the DHCP server (if using DHCP) or is the configured static IP address. The Lecture Recorder x2 supports IPv4 addresses. It does not support IPv6 addresses.

Configure a Static IP Address

Your network administrator may require you to use a static IP address for your VGADVI Broadcaster Pro.

To configure a static IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.



4. Select the radio button **use static address**, if not already selected.
5. Enter the desired **IP Address** and **Network Mask**.

Only IPv4 addresses are supported.

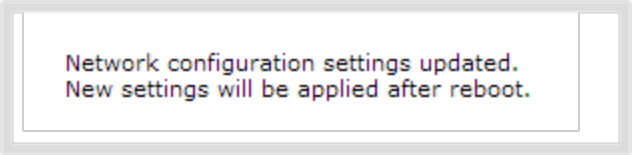
6. Enter the **Default Gateway** address. If you do not have a default gateway for your network, enter the new static IP address of the Lecture Recorder x2.

The default gateway cannot be left blank. If no default gateway is specified, unexpected behavior occurs.

7. Enter the **DNS Server** address. If you do not have a DNS server, enter the new static IP address of the device.

The DNS Server address cannot be left blank. If no DNS Server is specified, unexpected behavior occurs.

8. Change the **MTU Size** value only if needed. See the table below for information on maximum transmission unit (MTU) values.
9. Click **Apply** to save the changes; the changes are saved and a message appears asking you to reboot.



10. Select the **Maintenance** link under the Configuration menu; the maintenance page appears.
11. Click the **Reboot Now** button near the bottom of the page.
12. Wait for the system to reboot.
13. Open the Web interface using the new IP address.
14. Log as admin and reload the **Networking** page to verify all changes were applied.

The following table describes applicable fields when setting a static IP address.

Table 9 *Static IP Address Fields*

Label	Description/Options
Use DHCP	Select this radio button to dynamically obtain an IP address at boot up.
Use static address	Select this radio button to use the configured static IP address.
IP Address	The internet protocol address (IP Address) to assign. This value is may be obtained from your system administrator. The Lecture Recorder x2 supports IPv4 addresses. It does not support IPv6 addresses.
Network Mask	Also called the subnet mask, this value denotes a range of IP addresses. This value may be obtained from your system administrator, determined from another computer on the same subnet, or calculated using an online subnet calculator.

Label	Description/Options
Default Gateway	The network node that serves as an access point to the rest of the network. This value cannot be blank. Specify the system's IP address if you don't have a default gateway on your network.
DNS Server	The domain name system server (DNS server) translates human-readable hostnames into corresponding IP addresses. Specify the system's IP address if you don't have a DNS server on your network.
MTU Size	The maximum transmission unit (MTU) specifies the maximum packet size for transfer on the network. The default value is 1500, which is the largest value allowed by Ethernet at the network layer. It's best if all nodes in your network use the same value, so only change this value if you know other nodes use a different value.

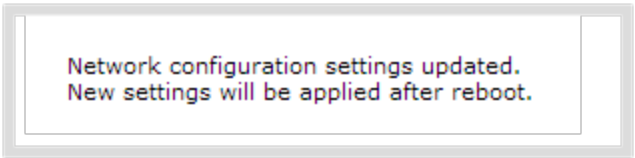
Configure DHCP

Occasionally, such as when moving your system to a new network, your Lecture Recorder x2 must switch from static IP address allocation to dynamic allocation via DHCP. You can accomplish this three ways:

- Use the factory reset button to clear all your settings. See Restoring Factory Configuration.
- Load a configuration file that uses DHCP networking. See Load a saved device configuration.
- Changing the network settings. See the procedure below.

To configure use of DHCP for networking:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Select the radio button **use DHCP**, if not already selected.
5. Change the **MTU Size** value only if needed. See the table below for information on maximum transmission unit (MTU) values.
6. Click **Apply** to save the changes; the changes are saved and a message appears asking you to reboot.



7. Select the **Maintenance** link under the Configuration menu; the maintenance page appears.
8. Click the **Reboot Now** button near the bottom of the page.
9. Wait for the system to reboot.
10. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
11. Log as admin and reload the Networking page to verify all changes were applied.

The following table describes the fields applicable when configuring DHCP on the Lecture Recorder x2.

Table 10 *DHCP Fields*

Label	Description/Options
Use DHCP	Select this radio button to dynamically obtain an IP address at boot up.
Use static address	Use static address Select this radio button to use the configured static IP address.
MTU Size	The maximum transmission unit (MTU) specifies the maximum packet size for transfer on the network. The default value is 1500, which is the largest value allowed by Ethernet at the network layer. It's best if all nodes in your network use the same value, so only change this value if you know other nodes use a different value.

Tether to a Mobile Network

The Lecture Recorder x2 supports tethering to a mobile device via USB. This can work side-by-side with Ethernet routing where one can be a back-up system for the other.

When the system falls over to the backup network type (i.e. from Ethernet to mobile, or vice versa) all streaming sessions are closed and the clients will need to reconnect. You may need to provide a new stream URL (containing the new IP address) to your viewers. See the channel information page to get the new stream URL.

All actively published streams are closed and reconnected via the mobile network automatically (assuming the required publishing server is accessible from the mobile network).

To configure tethering to a mobile network:

1. Configure the mobile device to allow tethering via USB.
2. Connect the mobile device to the Lecture Recorder x2 with a USB cable.
3. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.

4. Login as admin.
5. Select the **Network** link in the Configuration menu; the network configuration page opens.
6. Click the dropdown box next to **Use phone/tablet connection** in the USB phone/tablet section; the following choices appear:

Table 11 *Mobile Tethering Options*

Label	Description/Options
Disabled	Specifies that no USB tethering is permitted.
No tethering	Specifies that USB tethering is available for connecting a mobile device as a configuration utility (i.e use the web browser), but no mobile data is used.
Prefer ethernet	When chosen, the system tries to use the Ethernet network first. It switches to use the mobile network (tethering) when the Ethernet network is no longer available. To prevent viewer interruptions, mobile data will continue to be used until the mobile network is down or publishing is restarted.
Prefer tethering	When chosen, the system tries to use the mobile network (tethering) first. It switches to use the Ethernet (hard-wired) when the mobile network is no longer available. To prevent viewer interruptions, Ethernet data will continue to be used until the Ethernet network is down or publishing is restarted. Select this setting if you only have a mobile network.

7. Select your choice based on the table above.
8. Click **Apply**.

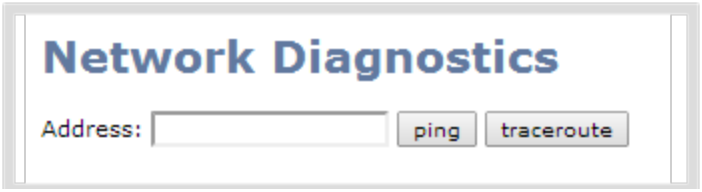
Perform Network Diagnostics

If your Lecture Recorder x2 has network trouble, you can perform basic network troubleshooting tasks from the Network configuration page. In addition to providing the device's IP address and MAC address to your network administrator (See Verify IP Address and MAC address), you can also ping an IP address or use traceroute to determine the path taken to an address.

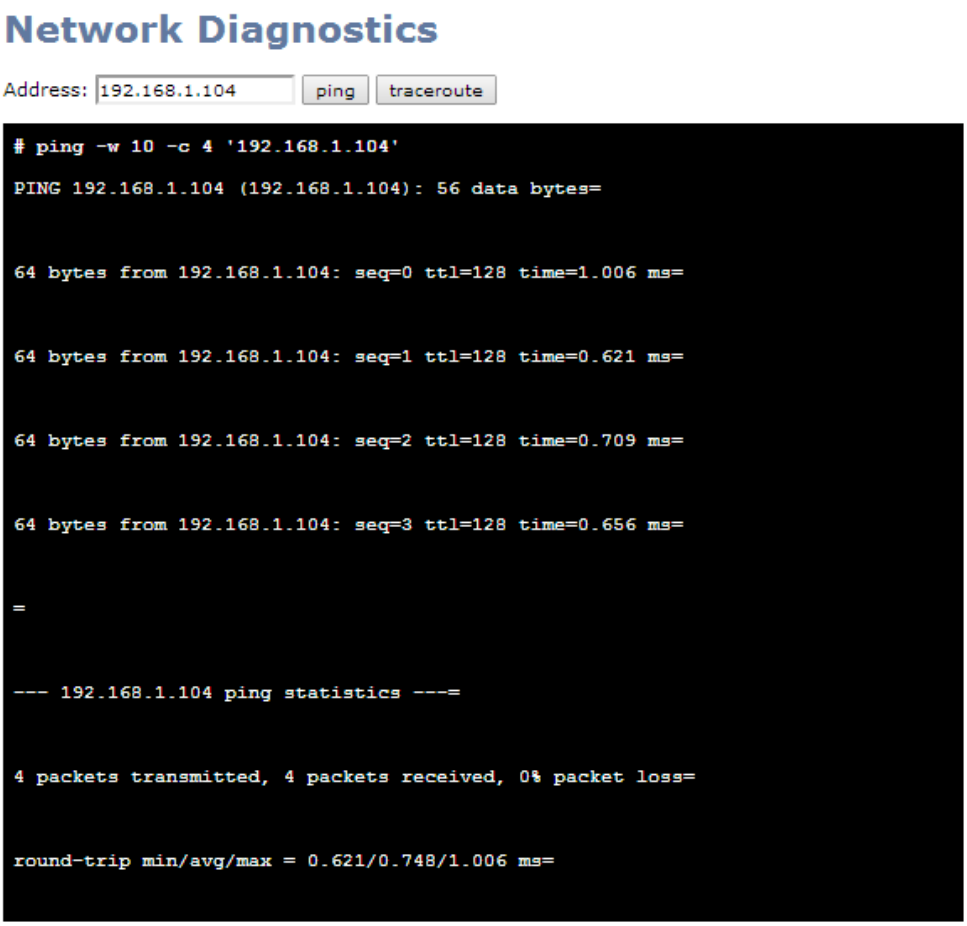
Note: Not all networks support ping and traceroute.

To ping or traceroute an IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.



4. Click **ping** or **traceroute**; an animation appears to the left of the address to indicate processing is underway.
5. Upon completion of the command, read the results from the console-like display is shown below the Network Diagnostics setting.



1-4 Configure Date and Time

The Lecture Recorder x2 uses the current date and time in naming recorded files and when synchronizing and timestamping inputs from multiple sources (i.e. when synchronizing an audio and a video source). The admin interface lets you specify date and time settings to ensure they are correctly configured for your time zone and your network. This section covers the following date and time-related topics:

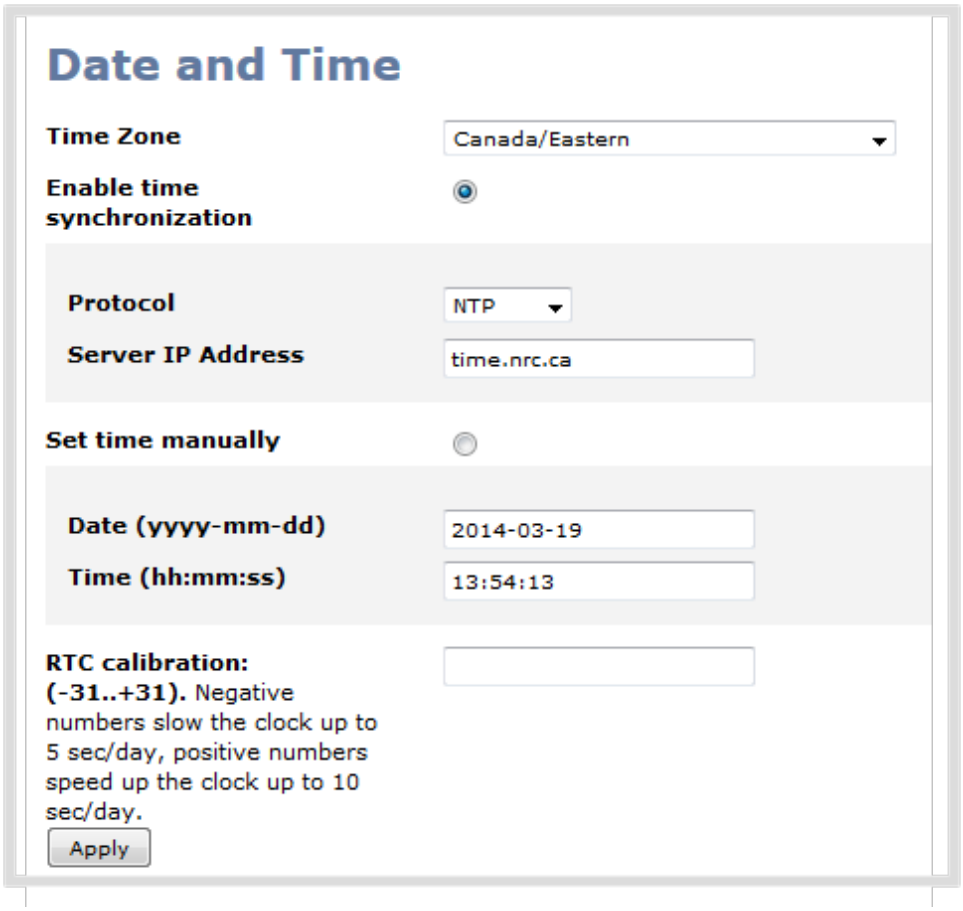
- Verify Date and Time Settings
- Change the Time Zone
- Configure Synchronized Time (NTP, PTP v1, and RDATE)
- Manually Configure the Date and Time

Verify Date and Time Settings

The current date, time, time zone, and synchronized time protocol settings are shown when the Date and Time configuration page is loaded in the Lecture Recorder x2 web interface.

To view settings on date and time configuration page:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens and the following information is displayed:



The date and time configuration page also indicates whether the device is currently using synchronized or manually set time, and whether or not a local network time protocol (ntp) server is running.

The following table describes the date and time configuration fields.

Table 12 *Date and Time Options*

Label	Description/Options
Time Zone	The currently selected time zone.
Enable time synchronization	Whether or not a time synchronization protocol is being used for setting time. (If not selected, time is set manually.)
Protocol	The time synchronization protocol.
Service IP Address	The time synchronization server address.
Set time manually	Whether or not time is set manually. (If time is not being set manually, a time synchronization protocol is used.)

Label	Description/Options
Date	The current date. (This is the current date even if the radio button Set time manually is not selected.)
Time	The current time. (This is the current time even if the radio button Set time manually is not selected.)

Change the Time Zone

By default the device has the Canada/Eastern time zone set. Configuration of the time zone is necessary to ensure synchronized time servers provide the correct time to the device.

To select another time zone:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Select the new time zone from the **Time Zone** drop down box.
5. Click **Apply**.

Configure Synchronized Time (NTP, PTP v1, and RDATE)

By default the Lecture Recorder x2 uses the network time protocol server (NTP server) protocol and the time server from National Research Council Canada. You can continue to use this time server or configure a new server that is more appropriate for your network and location. Your system administrator can provide the correct time synchronization server settings.

To set the time synchronization method:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Click the **Enable time synchronization** radio button if it is not already selected.
5. Choose one of the following choices from the **Protocols** drop down:

Table 13 Synchronized Time Options

Label	Description/Options
NTP	Network Time Protocol (NTP) is used for clock synchronization over the internet. There are many publicly available NTP servers you can use, or your company may have its own NTP server. For more information about NTP and to find NTP servers, refer to **http://support.ntp.org/bin/view/Servers/WebHome**.
RDATE	RDATE is a tool for querying the current time from the network. It is generally considered obsolete and has been replaced by NTP.
PTP v1	The Precision Time Protocol (PTP) is used for clock synchronization over the internet. It has clock accuracy in the sub-microsecond range, making it more granular than NTP.

6. Tailor the synchronization protocol with the required parameters as described below.
7. If **NTP** is selected:
    a. Enter the IP address or server name for the NTP server in the **Server IP Address** field.

NTP uses UDP packets and port 123. If the device is behind a firewall and accessing an external NTP server, UDP packets must be permitted on port 123.

8. If **RDATE** is selected:
    a. Enter the IP address or server name for the RDATE server in the **Server IP Address** field.
    b. Select an update interval from the drop down box.
9. If **PTP v1** is selected:
    a. Select the multicast address of PTP v1 server from the **PTP domain** dropdown.

PTP Domain	Description
Default	PTP at multicast address 224.0.1.129
Alternative 1	PTP at multicast address 224.0.1.130
Alternative 2	PTP at multicast address 224.0.1.131
Alternative 3	PTP at multicast address 224.0.1.132

PTP uses UDP packets and ports 319 and 320 . If the device is behind a firewall and accessing an external PTP server, UDP packets must be permitted on ports 319 and 320.

10. Click **Apply**.

Manually Configure the Date and Time

By default the Lecture Recorder x2 uses NTP for time synchronization. If your system does not have access to a time synchronization server, or if you do not wish to use one, you can choose to manually set the date and time.

To manually set the date and time:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Date and Time** link in the Configuration menu; the date and time configuration page opens.
4. Type the desired date in the **Date** field. Use the format yyyy-mm-dd.
5. Type the desired time in the **Time** field. Use the format hh:mm:ss.
6. Click **Apply**.

1-5 Restrict Viewers by IP Address

The Lecture Recorder x2 permits you to restrict which computers can access broadcasts by building a list of allowed and/or denied IP addresses.

IP address restriction is valid for the viewer only and does not affect the web interface or the mobile configuration interface.

If your viewer account has a password, your viewers must connect to the device from a computer (or gateway) with a permitted IP address and must also supply the username and password before they can view the broadcast.

IP Address restriction is not configurable per channel. Restrictions affect all broadcasts / streams from the device.

To restrict access by IP address you need to know the IP addresses, or range of addresses for your viewers. By default all IP addresses are allowed to connect to the broadcast.

If you're not familiar with creating allow/deny lists, refer to the examples below this procedure for assistance with crafting your lists.

To restrict viewers by IP address:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Access passwords** link in the Configuration menu; the password configuration page opens.
4. Type allowed IP addresses or address ranges in the **Allow IP's** field. Separate addresses with a comma.
5. Type denied IP addresses or address ranges in the **Deny IP's** field. Separate addresses with a comma.
6. Click **Apply**.

If a user attempts to connect to the stream from a disallowed IP address, access is denied. If connecting by internet browser, the message "IP address rejected." is displayed.

The following table describes the applicable fields.

Table 14 *IP Based Restriction Fields*

Label	Description/Options
Allow IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are permitted to view broadcasts from the device, provided their IP address is not in the Deny IP's list. To allow all (except IP addresses in the deny list, if any), leave the field blank. You can use the Allow list by itself, or in conjunction with the Deny IP's list as an exception to a rule in the allow list.
Deny IP's	Enter individual IP Addresses or IP Address ranges, separated by commas. To specify a range, use a hyphen (-). Optional spaces improve readability. Users connecting from addresses in this list are not allowed to view broadcasts from the device, unless their IP address is in the Allow IP's list. If a specific IP address is in both lists, access to the stream is denied. You can use the Deny list by itself, or in conjunction with the Allow IP's list as an exception to a rule in the allow list.

Examples

Allow List with Distinct IP Addresses

The simplest allow/deny list is to use the list of known IP addresses to craft a list of allowed IP addresses. All other addresses are denied access to the broadcast.

For example if your device is accessible on your local area network (LAN) and you want to make sure only the CEO's specific desktop, laptop and tablet computers (with IP Addresses 192.168.1.50, 192.168.1.51, and 192.165.1.75, respectively) can connect to the broadcast, construct the following allow list:

Allow: 192.168.1.50, 192.168.1.51, 192.168.1.75

Allow List with a Range of IP Addresses

Sometimes you'll want a range of computer IP addresses to connect to your device. This may happen when you have one range of IP addresses assigned to desktop computers (i.e. in the range 192.168.1.1 to 192.168.1.100) and another range assigned to boardroom computers (i.e. the range 192.168.1.200 to 192.168.1.250). If you only want the boardroom computers to connect to broadcasts from the device you can specify the range of boardroom IP addresses rather than needing to type in each individual address. The allow list looks as follows:

```
Allow: 192.168.1.200-192.168.1.250
```

Note that we could have specified two of the IP addresses in the previous example as a range.

Allow List with a Range of IP Addresses and One or More Specific IP Addresses

Putting the first two examples together, we want to permit access to IP addresses in the range of boardroom computers (192.168.1.200-192.168.1.250) and also want to add the desktop, laptop and tablet computers of the CEO (IP addresses 192.168.1.50, 192.168.1.51, and 192.168.1.75, respectively). Note the first two IP addresses are consecutive, so they can be added as a second range. Add these IP addresses to the list as follows:

```
Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75
```

Your list can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny List with Distinct IP Addresses

Another simple allow/deny list is to use the list of known IP addresses to list specific denied IP addresses. All other addresses are allowed access to the broadcast.

For example imagine your device is accessible on your local area network (LAN) and you want to allow any computer on the LAN can access the stream except your publicly-accessible boardroom (with IP address 192.168.1.211). You can use the following deny list (leave the allow list empty) to permit all computers except the boardroom computer:

```
Deny: 192.168.1.211
```

As with Allow lists, your deny list can specify a range of IP addresses, and can specify multiple ranges or distinct IP addresses in a comma-separated list.

Allow List with a Range of IP Addresses, Distinct IP Addresses, and an Exception

Building on the previous examples, consider the situation where you want the CEO's computers (192.168.1.50, 192.168.1.51, 192.168.75) and all boardroom computers (192.168.1.200-192.168.1.250) to access the broadcast, with the exception of the public boardroom computer (192.168.1.211). Use both allow and deny lists to create the rule as follows:

Allow: 192.168.1.200-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75

Deny: 192.168.1.211

Both lists can have multiple ranges and multiple distinct IP addresses, provided they are separated by commas.

Deny List with a Range of IP Addresses

Converse to the previous examples, consider the situation where you want every computer on the network to access the broadcast, with the exception of the CEO's desktop, laptop, and tablet computers. Additionally, boardroom computers should not be permitted with the exception of the cafeteria computer (IP address 192.168.1.222).

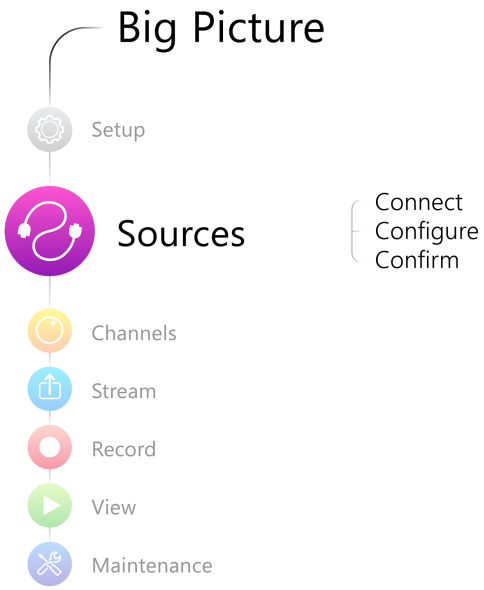
The deny list is an "exception" list for the allow list. So to craft the rule described above we need to allow all the computers in the local subnet, then deny specific sub-ranges including two groups of boardroom computers ensuring the cafeteria computer's IP address is not in the deny list:

Allow: 192.168.1.1-192.168.1.250

Deny: 192.168.1.200-192.168.1.221, 192.168.1.223-192.168.1.250, 192.168.1.50-192.168.1.51, 192.168.1.75

PART 2: Sources

Now that you know how to connect to the admin interface, you are ready to configure your input sources. The following sections provide an overview of the types of sources you can connect to your Lecture Recorder x2 and how to configure each source.



The following topics are covered:

- Identify sources
- Configure a video source
- Configure an audio source
- Fine-tune source configuration

2-1 Identify sources

A source can be an image, video, or audio from a camera, a computer screen or any device that provides a VGA, DVI, HDMI, S-Video and audio signal output. Prior to powering up the Lecture Recorder x2 connect the input sources to the following input ports on the device:

Table 15 *Cable and port connections*

Cable	Input Port
connect VGA, HDMI or DVI (dual or single link, depending on your device)	DVI port
connect composite or S-video source	S-Video port
connect audio	Audio Input port

The web interface automatically discovers all input sources and displays them in the Stream Setup section of the web admin interface.

When a source is connected, the system automatically detects and adjusts the image capture settings at start up and continues to adjust every 60 seconds during operation (interval is configurable). The system's goal is to produce the best quality captured image given the source equipment used. Generally no further configuration is needed.

2-2 Configure a video source

To configure a source:

The following adjustments cannot be made for S-Video sources.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Ensure a source is connected to the input port, see Table Configure a video source.
4. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
5. Make fine adjustments if required, however in most cases the video is ready to view from a channel and ready to stream.

Value	Description
Use signal from	Specify the native color space of the signal source, either RGB or YUV. The following values are available: • VGA/DVI signal (RGB) (this is the default setting) • Component signal (YCrCb)
Interval between VGA signal and autoadjustments (sec)	When a source is setup, the system automatically detects and adjusts the image capture settings at start up and continues to adjust every 60 seconds during operation. To change the number of seconds between update, enter a value, or 0 to disable the feature, otherwise the default of 60 seconds is set.
Vertical shift	When an image is not aligned in the window, use this feature to move an image up or down on the screen. The values range from 20 (moves the image up) to –20 (moves the image down).
Horizontal shift	When an image is not aligned in the window, use this feature to move an image left or right on the screen. The values range from -999 (moves the image to the left) to 999 (moves the image to the right).
Phase	Specifies phase adjustments for VGA signals. Generally not used unless value is provided by Epiphan support.

Value	Description
PLL adjustment	Changing the value adjusts the horizontal resolution of the image. Adjust the value using small increments until the image is sharper. The value ranges from 0-999 to 999.
Offset	The Offset and Gain parameters function as contrast control for an image. The Offset controls the darker parts of the image and the gain controls the bright parts of the image. Adjust both values to optimize image quality. Adjust the values using small increments until the image is sharper. If you set Offset to a high value, set a high value for the gain to balance the two.
Gain	The Gain and Offset parameters function as contrast control for an image. The Gain controls the bright parts of the image and Offset controls the darker parts of the image. Adjust both values to optimize image quality. Adjust the values using small increments until the image is sharper. If you set Offset to a high value, set a high value for the Gain to balance the two.
Aspect Ratio	Sets the aspect ratio of the captured image. The default is 4:3. Set the value to Wide mode when capturing images that have a wide aspect ratio. Using the incorrect setting causes the image to be distorted or stretched.
HSync threshold	Adjust horizontal sync detection.
VSync threshold	Adjust vertical sync detection.

2-3 Configure an audio source

The Lecture Recorder x2 web interface automatically discovers all input sources and displays them in the Stream Setup section of the web interface. Audio input devices such as a microphone and portable music players can send audio signals to the Lecture Recorder x2 using the audio input port.

All available video formats support audio except Motion JPEG.

Use the following sections to configure the audio settings that control the audio input:

Add an audio source to a channel

Configure audio settings

Set audio volume

View audio signal strength

Add an audio source to a channel

To add an audio source to a channel:

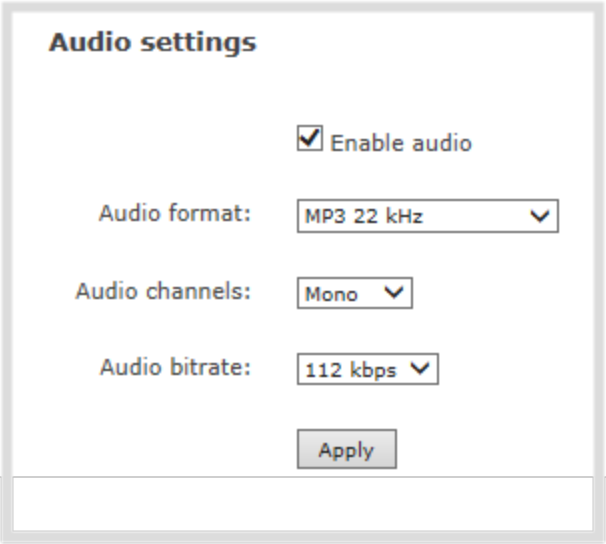
1. Ensure an audio input source is connected to the device.
2. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
3. Login as admin.
4. From the web interface, click **Stream Setup**; the Stream setup page opens.
5. Scroll to the Audio Settings section.
6. Click **Enable audio**.
7. Click **Apply**.
8. To select an audio codec for an audio stream, see Fine-tune channel configuration.

Configure audio settings

To configure audio settings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.

3. From the web interface, scroll to the channel section and click the channel to which you want to configure audio settings; the menu expands.
4. Click **Stream Setup**; the Stream setup configuration page opens.
5. Scroll to Audio settings.



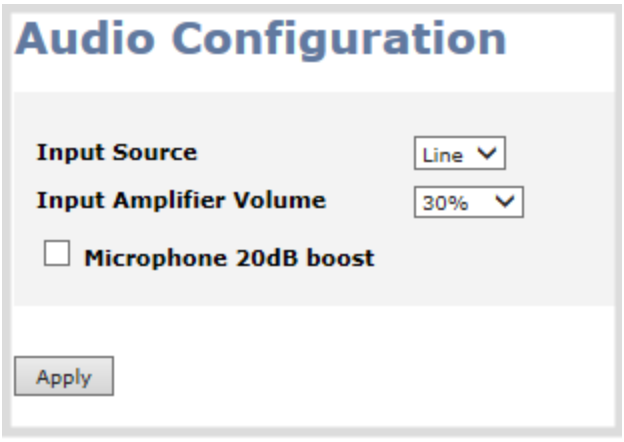
6. Check **Enable audio** check box.
7. If the default audio format (PCM 22KHz) is not desired, click the **Audio format** drop-down menu to elect an audio codec. See Fine-tune channel configuration for help choosing one of the supported audio codecs.
8. Click on the **Audio channels** drop-down menu to choose mono (1 channel) or stereo (2 channels).
9. Click on the **Audio bitrate** drop-down menu to choose the audio transmission speed. Increasing this value produces better sound quality but uses more system processing power and bandwidth.
10. Click **Apply**.

Set audio volume

To set audio volume (not this is done on the encoder, and not the VGA Grid):

1. Ensure an audio input source is connected to an audio input port.
2. Connect to the admin interface using your preferred connection method. See Connect to the Admin Interface.
3. Login as admin.

4. From the web interface, scroll to the Configuration section.
5. Click **Audio**; the following window opens.



6. Select the Input source from the drop-down menu. Choose **Line** (default setting), to capture system audio, or choose **Mic** to capture audio from a microphone connected to the audio input port.
7. Click on the **Input Amplifier volume** drop-down menu. A list of percentages is displayed. Choose to amplify the volume by a percentage of the original volume. The default setting is 30%. Decrease the percentage if the output volume is too loud. Increase the percentage if the output volume is not loud enough.

Adjusting the **Input Amplifier volume** adjusts the output audio as well.

8. Enable **Microphone 20dB boost** to provide additional amplification for the microphone inputs.
9. Click **Apply**.

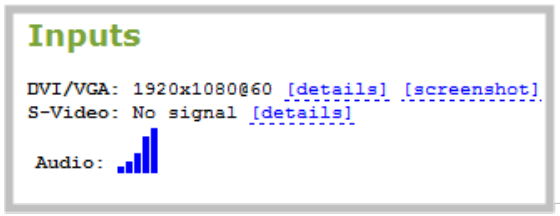
View audio signal strength

An audio meter indicates the signal strength of an audio source. If the signal is weak you may experience volume quality issues. You can adjust the output volume on the audio source and/or adjust the capture volume, see Set audio volume.

To view audio signal strength when an audio source is connected to the device:

1. Ensure an audio input source is connected to an audio input port.
2. Connect to the admin interface using your preferred connection method. See Connect to the Admin Interface.
3. Login as admin or operator.
4. From the web interface, click **Info** menu option.

5. Scroll to the Input section. The Audio meter is displayed.



6. View the strength of the audio signal. The following example shows an audio input with a strong signal.

2-4 Fine-tune source configuration

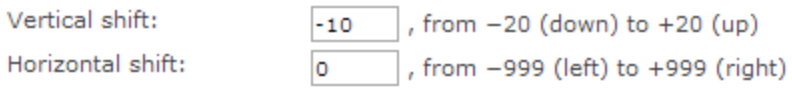
In addition to fine tuning channel settings such as frame rate, resolution and bit rate to ensure optimal use of resources while streaming a quality video, there may be circumstance when you must fine tune the video input source.

Changing how source images are displayed may cause undesired results, for example experimenting with the PLL setting may result in the image not being displayed properly. It is a good practice to backup your configuration settings so that you can revert back to a good configuration if the changes that you made are not desirable. See Save and Restore Device Configuration .

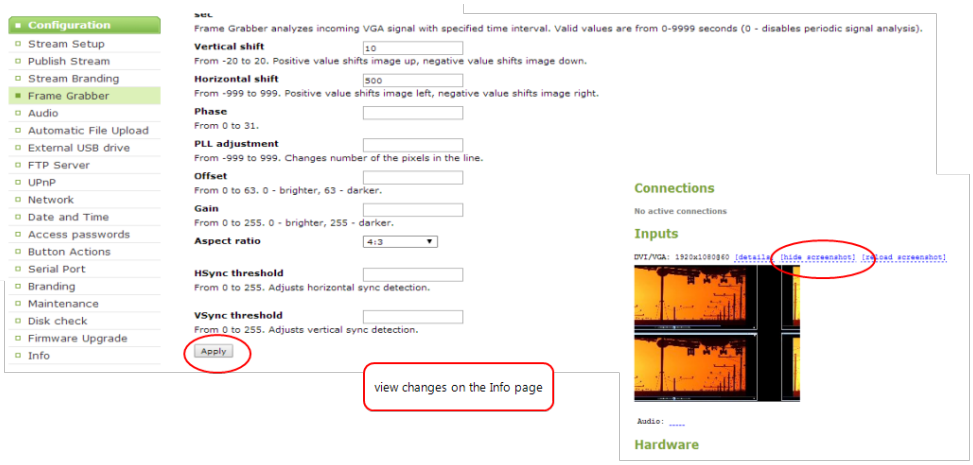
Video is not centered on the screen

The image from the source is displayed too high or low, or too far to the left or right.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
4. To move the video horizontally to the left or right, scroll to **Horizontal shift** .
5. Enter incremental values to shift the video image to the left (use a negative value) or right (use a positive value).



6. Click **Apply**. View the output by clicking on the **Snapshot** link in the Info window. You may need to make further adjustments to move the video left or right.



7. Click **Apply** after each change to confirm the results.
8. To move the video up or down, scroll to **Vertical shift** .
9. Enter incremental values to shift the video image down (use a negative value) or up (use a positive value).
10. Click **Apply**.View the output by clicking on the **Snapshot** link in the Info window. You may need to make further adjustments to move the video up or down.

Video is too bright, too dark or washed out

If the video from the source is too light, too dark or washed out, use the offset and gain controls together to optimize image quality. Increasing the gain amplifies weak signals but also increases noise, you must balance offset and gain values to achieve the best quality image.

Adjust these settings by the smallest values possible; compensate for a large change to one by making a large change to the other. Setting both offset and gain to high values can result in poor video quality.

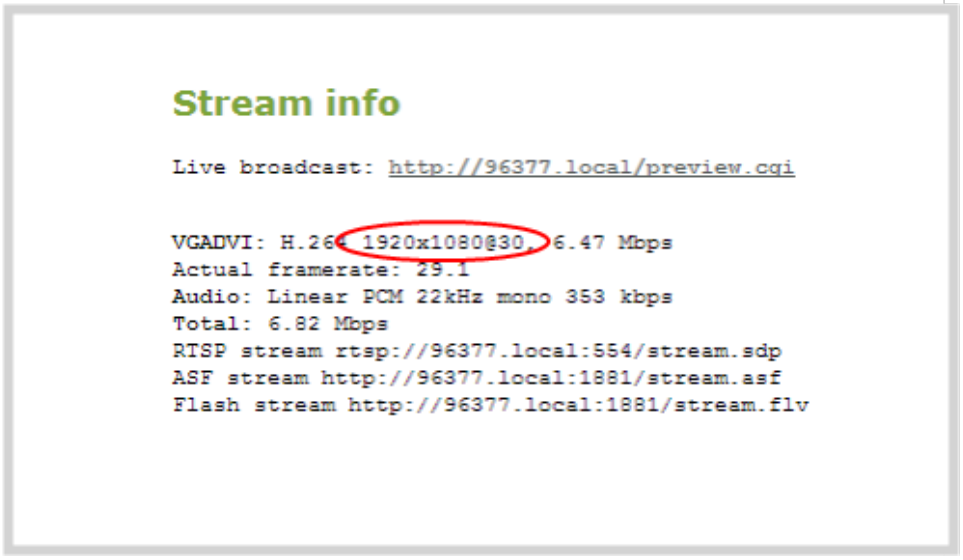
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
4. Scroll to **Gain**.
5. Enter a small value, for example 1 to 25 in the field to brighten the image.
6. Scroll to **Offset**.
7. Enter a small value, for example 1 to 15 , to balance the gain setting . The Offset value behaves as a contrast to the Gain value.

8. Click **Apply**. View the output by clicking on the Snapshot link in the Info window. You may need to make further adjustments to fine tune the brightness and contrast.

Video looks squished

The image is squeezed horizontally on the screen. This distortion occurs when there's a mismatch between the aspect ratio the Lecture Recorder x2 detects and the aspect ratio that is sent from the source signal. To compare the two signal values, you must know the aspect ratio that the source is sending.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Info**; the info window opens.



4. Compare the aspect ratio from the source with the aspect ratio from theLecture Recorder x2 info window. Confirm if there is a mismatch.
5. If there is a mismatch, go to the stream setup for the channel and change the frame size to match the frame size that is sent from the source. See Configure channels.
6. If the video is still squeezed horizontally on the screen, follow the steps below.
7. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
8. Scroll to the Aspect ratio setting.
9. Select **Wide mode** from the drop-down menu, when the source is wider than what is being displayed in the preview or Live View.
10. Click **Apply**. View the output by clicking on the Snapshot link in the Info window.

Remove the combing effect on images

When frames are interlaced, artifacts from one frame may appear on the next frame. This occurs when a fast motion video is interlaced. Since each frame is captured from a different point in time, the action captured in one frame is carried over to the next frame. The result is a blurred image and horizontal lines running across the video.

To convert an interlaced source signal to a non-interlaced signal.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
4. Enable the **Enable deinterlace** setting.
5. Click **Apply**. View the output by clicking on the Snapshot link in the Info window.

Force the video source to use a specific resolution

Extended display identification data (EDID) is data provided by a video display device (usually a monitor) to describe its capabilities to a video source. The video source uses the EDID to determine the capabilities of the monitor to determine the resolution, color depth and other settings that the monitor can support. EDID is crucial for DVI sources but mostly ignored by VGA sources.

When you connect the VGADVI to a video source, the video source sees the device as a monitor. Just like a monitor, the VGADVI contains the EDID that is used by the video source to determine the video signal to send.

Upload a new EDID

In most circumstances the factory installed default EDID, is sufficient. However, there may be some cases where a video source uses resolutions that you do not want to use. In that case you can choose an EDID that forces the video source to use a specific resolution.

The uploaded EDID is permanently installed on your VGADVI and will always share this EDID with the video input source.

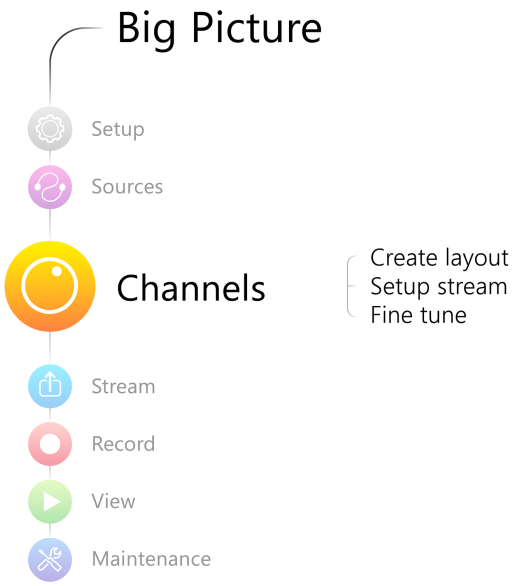
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.

3. To download a new EDID file, go to **Epiphan Downloads**. The downloads page opens.
4. Click **EDID**; a page displaying a list of EDIDs opens.
5. Click on an EDID from the list. The file is saved to your downloads folder on your C: drive.
6. From the web interface, click **Frame Grabber** from the Configuration menu; the Frame Grabber Adjustments page opens.
7. Scroll to EDID upload.
8. Click **Choose File**. A browser page opens.
9. Browse to the location where the custom EDID file was saved and select the file.
10. Click **open**. The EDID is uploaded. An information dialog box appears.
11. Click **OK**. The browser window closes.

PART 3: Channels

Channels organize and display content captured from DVI, VGA, HDMI, audio and camera input sources. A channel can be set up to display the content from one input source, or may capture, stream and record content from two input sources. You can identify your channel by adding a corporate logo, company information, corporate color and time stamps.

Through channel configuration and fine tuning you can maximize your stream quality, minimize your processing requirements and bandwidth and specify how the video is presented and streamed to a sharing destination/viewer.



This section discusses the following topics related to channel configuration:

- Configure channels
- Fine-tune channel configuration
- Customize your channel

3-1 Configure channels

Channels make your sources available for viewing and recording. You choose how you want to configure the sources to make a channel.

This section covers the following topics for creating channels:

- Create a DVI channel
- Create a Video channel
- Enable and disable a channel
- Configure picture in picture or picture with picture layout

While configuring a channel, consider opening a live preview of the channel in another tab or browser window so you can see the changes as they are applied. Right-click **Live View** and select open in a new window or open in a new tab to start the preview.

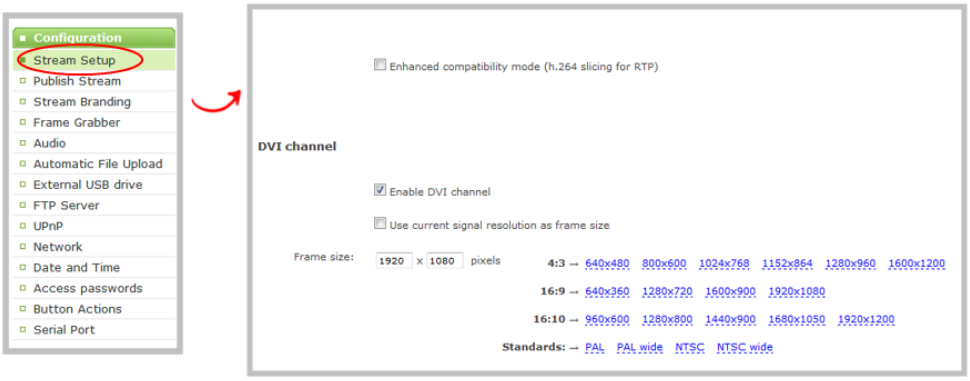
Create a DVI channel

A single source channel displays the output from one source in one viewing screen. Follow the steps below to create a DVI channel. In this section you can choose settings that maximize your stream quality, while minimizing your processing requirements and bandwidth by adjusting frame rate, resolution and bit rate.

Procedures to select a codec for compression, add a time stamp to the stream, and select a layout when two sources are configured are described in separate procedures.

To add a DVI channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Ensure a DVI input source is connected to the device.
4. From the side menu, scroll to the Channels section.
5. Click **Stream Setup**; the Stream setup page opens.



6. Scroll to the DVI Channel section.
7. Check the Enable DVI channel checkbox.
8. If you're not sure what **Codec** to pick, keep the default, H.264. For help selecting a codec, refer to Fine-tune channel configuration
9. Keep the default **video encoding preset** and **video encoding profile** for help selecting these values, refer to Fine-tune channel configuration
10. Perform one of the following steps:
    a. Check the **Use current signal resolution as the frame size** check box. Typically you want to broadcast at the same frame size as the source.

    Enabling this feature greys out the fields to change the frame size. Changing the input signal resolution may lead to interrupted streaming and recording. Enabling this feature may not be suitable for systems where input resolution is changed frequently.

    b. Change the frame size, follow the steps below.
11. Set the **Frame size** to reflect the same dimensions as your source or as sharing destination. Default values cover popular resolutions of cameras and display devices such as monitors or choose one of the following:
    a. Type a frame size in the field; or
    b. Select an option from the sizes shown, the dimensions will appear in the frame size field.

To verify your frame size setting, click on the **Live View** menu option. The content is displayed using the selected frame size

12. Check the **Keep aspect ratio** checkbox to preserve the source aspect ratio when scaling

If you choose to keep the aspect ratio of the source and your selected output frame size aspect ratio is wider than the source aspect ratio, bars will appear on the sides of the video. If the frame size aspect ratio is taller than the source, bars will appear at the top and bottom of the output. See **Control the matte (black bars) in the video output**.

13. Click on the **Key frame interval** drop-down box to choose how often a key frame (a frame that contains all the pixels) is used when streaming the video. The longer the key frame interval the smaller the video file size, and vice versa. The higher the value the faster a user moves through the frames of the video when using the search function of their media player. For more information on adjusting this feature to reduce bandwidth and system resources, see Fine-tune channel configuration .
14. Change the **Limit frame rate**. The default should be adequate in most applications. While decreasing the limit may improve system performance, you may need to test different values to balance video smoothness and processing power.
15. Increase or decrease image quality by increasing or decreasing the target **Bitrate** value when H.264 and MPEG4 codecs are used. Video with a high level of motion and high resolution, such as a sporting event, requires a high bitrate.

Raising this value uses more system processing power and bandwidth.

16. Set the Quality parameter when the Motion JPEG codec is used to increase or decrease image quality. This feature has the same behavior as the Bitrate value used for H.264 and MPEG4 codecs.
17. To configure the **Show time label**, see Creating a time stamp in the Customize your channel
18. Click **Apply**.

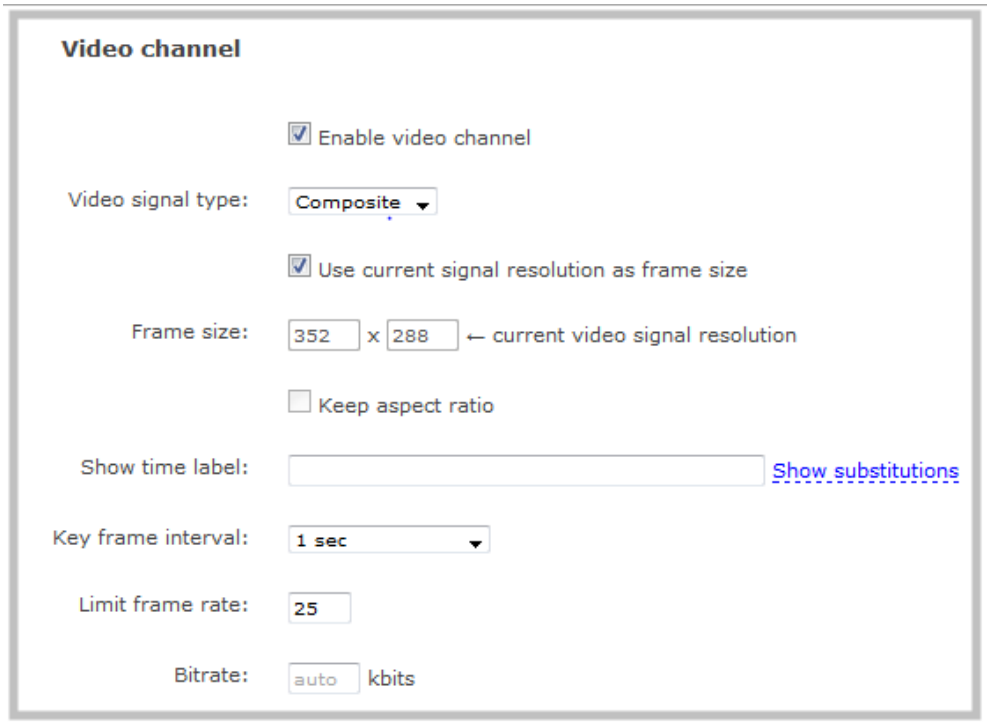
Create a Video channel

Follow the steps below to create an S-Video channel. Procedures to select a codec for compressions and decompression, add a time stamp to the stream, and select a layout when two channels are configured are described in separate procedures.

To add a video channel:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Ensure an S-Video input source is connected to the device.
4. From the web interface, click **Stream Setup**; the stream setup window opens.

5. If you're not sure which codec to pick, keep the default, H.264. For help selecting a codec, refer to Fine-tune channel configuration
6. Keep the default video encoding preset and profile, or for help selecting these values, refer to Fine-tune channel configuration
7. Scroll to the Video Channel section.
8. Select the **Enable video channel** check box, if not already selected.



9. Perform one of the follow:
    a. If a DVI and video source is configured, you can combine both sources into one channel. See Configure picture in picture or picture with picture layout.
    b. If a single source is configured for the channel go to the next step.
8. Specify the type of video signal coming from the S-Video source. The options are S-Video or Composite.
9. Perform one of the following:
    a. Check the **Use current signal resolution as the frame size** check box. Typically you want to broadcast at the same frame size as your monitor. Skip the next step.

> Enabling this feature greys out the fields to change the frame size. Options for an S-Video channel are based on SD camera resolutions, while DVI channels have a wide range of frame size options.

b. Change the frame size, follow the steps below.

10. Set the Frame size to reflect the same dimensions as your sharing destination. Default values cover common sharing destinations such as websites or choose one of the following.
    a. Type a frame size in the field; or
    b. Select an option from the sizes shown, the dimensions will appear in the frame size field.
11. Check the Keep aspect ratio check box to preserve the aspect ratio when scaling a frame size.

> If you choose to keep the aspect ratio of the source and your selected output frame size aspect ratio is wider than the source aspect ratio, bars will appear on the sides of the video. If the frame size aspect ratio is taller than the source, bars will appear at the top and bottom of the output. See Control the matte (black bars) in the video output

12. Click on the **Key frame interval** drop-down box to choose how often a key frame (a frame that contains all the pixels) is used when streaming the video. The longer the key frame interval the smaller the video file size, and vice versa. The higher the value the faster a user moves through the frames of the video when using the search function of their media player.

> For multiple source channels the key frame interval is configured in the DVI section.

13. Change the frame rate limit. The default should be adequate in most applications. While decreasing the limit may improve system performance, you may need to test different values to balance smoothness and processing power.

> For multiple source channels frame rate is configured in the DVI section.

14. Increase or decrease image quality by increasing or decreasing the **Bitrate** value when H.264 and MPEG4 codecs are used. The default bitrate is set to 4000 kbit/s.

> Raising this value uses more system processing power and bandwidth.

> For multiple source channels bitrate is configured in the DVI section.

15. To configure the **Show time label**, see Add a time stamp to your channel

> For multiple source channels timestamp is configured in the DVI section.

16. Click **Apply**.

Configure picture in picture or picture with picture layout

When your Lecture Recorder x2 has two attached video sources, you can create a layout for the recording/broadcast and specify how each video is positioned on the screen. You can choose one of the following layouts:

- A single stream that combines both video and DVI channels into a traditional picture in picture layout. Both video source signals and an audio source signal are combined and recorded to one file containing one video and one audio track.
- A single stream that combines both video and DVI channels a picture beside picture layout. Both video source signals and an audio source signal are combined and recorded to one file containing one video signal and one audio track.
- Independent streams for each of video and DVI. Each stream has a different URL. Video source signals and the audio source signal are recorded as separate tracks in a multi-track file.

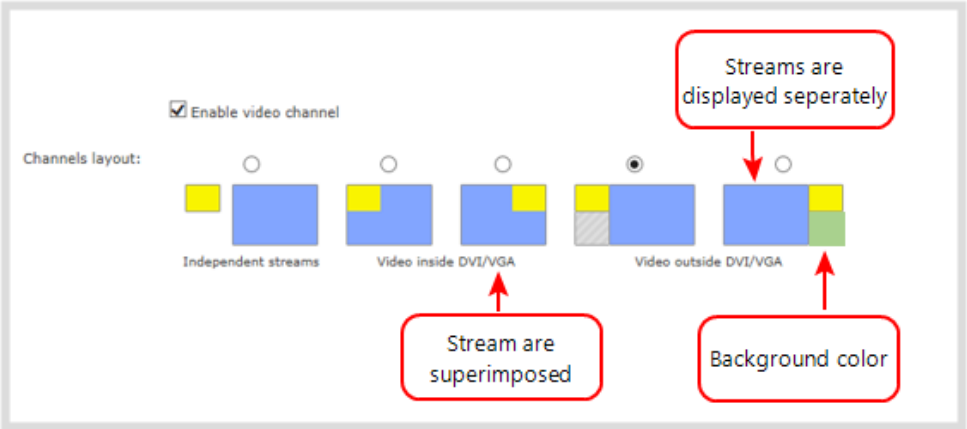
To create a picture in picture or picture with picture layout:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Ensure two video input sources are connected to the device.
4. From the web interface, click **Stream setup**; the Stream setup page opens.
5. Scroll to the DVI channel section.
6. Check the **Enable DVI channel** check box.
7. Scroll to the Video channel section.
8. Check the **Enable video channel check box**.

Channel source layout is not available if Enable video channel is unchecked.

9. Select a Picture in Picture layout to specify how each input source (DVI or VGA and S-video) is streamed.

Hardware limits the position of the S-Video picture to align with a multiple of 32 pixels. As a result, it's possible there is a small gap between the DVI/VGA and S-Video streams, or that the S-Video stream is not perfectly right-aligned when superimposed over the DVI/VGA stream.

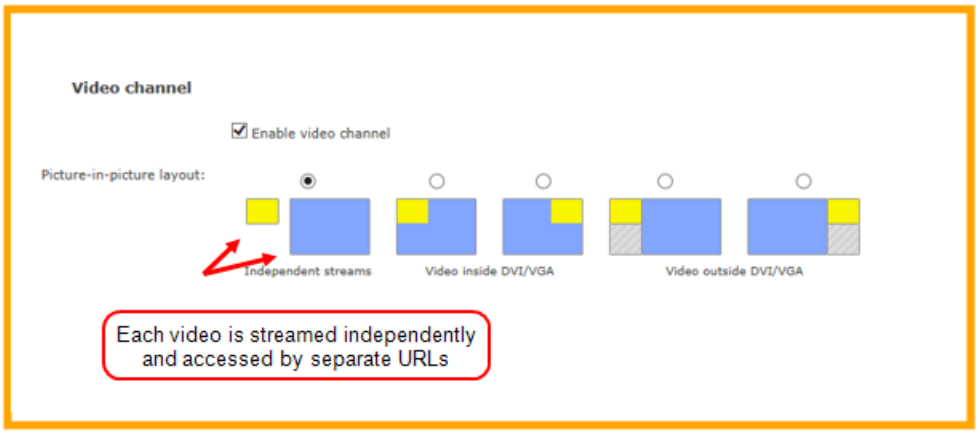


10. Click the **Video signal type** drop-down menu to specify if the video signal from the input source is composite or S-video.
11. To choose a background color or to add a brand to your streaming video, see Customize your channel.
12. To set the frame size of the streaming video, see Upscale or downscale your video image
13. To add a timestamp to your streaming video, see Add a time stamp to your channel.
14. Click **Apply**.

To create independent streams (picture beside picture), follow the steps below.

When independent streams are published, audio is streamed with the DVI stream.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. From the web interface, scroll to the Channels menu option.
4. Click on the link for the channel you want to configure; the menu expands.
5. Click **Stream Setup**; a Stream setup window opens.
6. Scroll to the Video channel section.
7. Check the **Enable video channel** checkbox if the recording is a video signal from an analog source.
8. Select **Independent streams** layout to specify how the two input sources (DVI/VGA and S-video) are streamed and recorded.



Independent streams are supported when the codec value is H.264 and the **Video encoding profile** value is Main or High. Otherwise the option is greyed out.

9. Click the **Video signal type** drop-down menu to specify if the video signal from the input source is composite or S-video.
10. To choose a background color or to add a brand, go to Customize your channel.
11. To set the frame size of the streaming video, go to Upscale or downscale your video image
12. To add a timestamp to your streaming video, go to Add a time stamp to your channel.
13. Click **Apply**.

Enable and disable a channel

When channels are configured as two independent streams, you can re-configure it to stream one of the channels depending on the content you want to capture, record and stream.

To enable or disable one of the independent streams (DVI channel or Video channel), follow the steps below.

1. From the web interface, click the **Stream Setup** option.
2. Check or uncheck the **Enable DVI channel** checkbox to enable or disable the DVI channel.
3. Check or uncheck the **Enable video channel** checkbox to enable or disable the video channel.
4. Click **Apply**.

3-2 Fine-tune channel configuration

In addition to adjusting typical features such as frame rate, resolution and bit rate to reduce bandwidth and system resource usage, choose the following settings to maximize your stream quality, while minimizing your processing requirements and bandwidth:

- Choose a codec to maximize your stream quality
- Codec and file format compatibility
- Adjust video quality
- Upscale or downscale your video image
- Control the matte (black bars) in the video output
- Unstretch the output video
- Limit the frame rate
- Adjust key frame interval

Choose a codec to maximize your stream quality

Before you begin recording and streaming content from a channel, you must select the codec that will be used to compress the channel's video and audio content. Deciding on which codec to use depends on how you prioritize the following criteria:

- Compatibility with streaming formats and file playback options
- Size of the compressed file
- Compression speed
- Image quality

For example, if you require a high quality image, the trade-off might be a larger file size, or slower compression speed. If you require live streaming and therefore cannot tolerate slow compression, the trade-off might be a lower resolution. The table below highlights the advantages and disadvantages of supported codecs.

Once you select video and audio codecs a list of available video format and standards specific to the selected codec is generated and displayed. You can provide the URLs and files to participants to view the broadcast, see Stream your video.

Select a video codec

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.

2. Login as admin.
3. From the web interface, click the **Stream Setup** menu option; the Stream setup configuration page opens.
4. Click the **Codec** drop-down menu to change the size and speed of the compression and decompression and the quality of the image. Choose one of the following options from the **Codec** drop-down menu.

Value	Description
H.264	H. 264 is the default value and provides high quality video while using low bandwidth. This is the preferred codec for the system.
Motion JPEG	This is suitable for live streaming and video, however may have low quality images while using high bandwidth. Motion JPEG does not support audio.
MPEG-4	This may be suitable for presentations. Provides good image quality, while using moderate bandwidth.

5. Click **Apply**.

Select an audio codec

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click the **Stream Setup** menu option; the Stream setup configuration page opens.
4. Click on the drop-down menu next to **Audio format**.
5. Choose one of the following codec options from the **Audio format** drop-down menu.

Value	Description
MP3	MP3 is the default value and provides a common audio format for audio storage. The 22 and 44KHz values define sound clarity. 44KHz provides higher sampling of the analog signal.
PCM	Pulse Code Modulation (PCM) is a standard for digital audio in computer and other devices such as, digital telephone systems. The 22KHz and 44KHz values define sound clarity. 44KHz provides higher sampling of the analog signal.
AAC	This codec is comparable with MP3, and may have better sound quality with a similar bit rate. The 16, 22 and 44KHz values define sound clarity. 44KHz provides higher sampling of the analog signal. Most devices support AAC.

Value	Description
G.711 8KHz (a-Law)	Used primarily in North America for streaming and recording voice. This codec uses only 64kbps of bandwidth.
G.711 8KHz (μ-Law)	Used in counties outside North America.

Codec and file format compatibility

The following table displays the compatibility between the video/audio codecs and formats supported for streaming.

Video Codec selected	Audio Codec selected	RTSP	FLV	ASF	MPEG-TS	MJPEG
H.264	No audio codec	✓	✓	✓	✓	·
H.264	LPCM	✓	✓	✓	·	·
H.264	G.711	✓	·	✓	·	·
H.264	MP3	✓	✓	✓	✓	·
H.264	AAC	✓	✓	✓	✓	·
MPEG-4	No audio codec	✓	·	✓	·	·
MPEG-4	LPCM	✓	·	✓	·	·
MPEG-4	G.711	✓	·	✓	·	·
MPEG-4	MP3	✓	·	✓	·	·
MPEG-4	AAC	✓	·	✓	·	·
MJPEG	No audio codec	·	·	·	·	✓

The following table displays the compatibility between the video/audio codecs and formats supported for recording.

Video Codec selected	Audio Codec selected	AVI	MOV	MPEG-TS
H.264	No audio codec	✓	✓	✓
H.264	LPCM	✓	✓	·
H.264	G.711	✓	✓	·

Video Codec selected	Audio Codec selected	AVI	MOV	MPEG-TS
H.264	MP3	✓	✓	✓
H.264	AAC	✓	✓	✓
MPEG-4	No audio codec	✓	✓	·
MPEG-4	LPCM	✓	✓	·
MPEG-4	G.711	✓	✓	·
MPEG-4	MP3	✓	✓	·
MPEG-4	AAC	✓	✓	·
MJPEG	No audio codec	·	·	·

Adjust video quality

After sources are connected and channels are created, adjustments can be made to address the different bandwidth and devices used by the sharing destinations. Ideally you want to choose formats that will reach the majority of your participants.

Default values have been carefully selected to provide maximum performance in most environments. In most cases it is not necessary to change the encoding settings.

To encode your video stream:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream Setup**; a Stream setup page opens.
4. Click **Video encoding preset** to define how a video stream is encoded. Choose one of the following:

Value	Description
High quality	Choose this option when you are streaming content such as slides or slow moving video.
High speed	Choose this option when you are streaming medium to fast moving video.
Default	Factory default is high speed.

5. Click **Video encoding profile** to limit or include video formats that are supported. Choose one of the following:

Value	Description
Baseline	Choose this option when streaming to an application that requires robustness and cannot tolerate data loss, for example video-conferencing.
Main	Choose this option for standard-definition broadcasts. This is the default.
Default	Choose this option when video is viewed for broadcast and disk storage applications, particularly for high definition television application such as Blu-ray disk storage format and HDTV broadcast service.

Video encoding profile and preset can be set when H.264 codec is selected.

6. Check the check box for **Enhanced compatibility mode (h.264 slicing for RTP)** to provide operating stability when the video and audio stream are not supported by the viewer's equipment. When this feature is enabled, each frame is sub divided into one or more slices. Each slice is self-contained, all information for decoding is available within the slice. This is valuable when packet size exceeds the maximum allowable amount. Therefore losing a slice will not impact the entire frame.

Packet slicing adds to overhead and impacts compression efficiency. A value can be set when H.264 codec is selected.

7. Set the Rate Control mode when H.264 and MPEG4 codecs are set. The values define how strictly the codec adheres to the specified bitrate. Choose one of the following options from the Rate control mode drop-down menu.

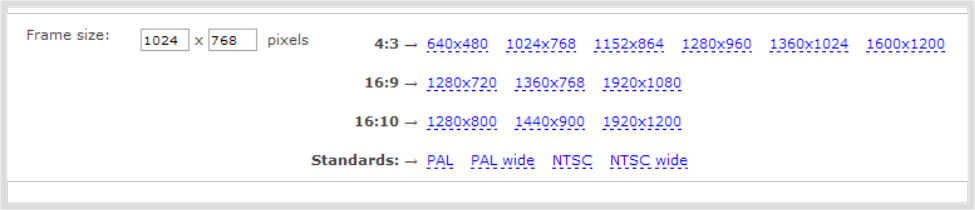
Value	Description
Relaxed	Choose Relaxed when streaming multimedia content and there is available bandwidth, the quality of the multimedia stream must be constant and the bit rate can vary.
Balanced	Choose Balanced when streaming multimedia content that has periods of high and low bit rates. The target bit rate is met by averaging the bit rate.
Strong	Choose Strong when streaming multimedia content when limited bandwidth is available and a constant frame rate is required. There may be a decrease in video quality if there is a lot of motion.

8. Click **Apply.**

Upscale or downscale your video image

If your source input is larger than your desired output frame size or if you want to stream a less bandwidth-hungry version of the content, you can downscale the source by specifying a frame size that uses the same aspect ratio. By contrast you can also enlarge the image by selecting a value that is larger than the source resolution.

The Lecture Recorder x2 conveniently provides a list of common aspect ratios and different frame sizes at each ratio on the Stream Setup page.



For example:

- input signal resolution is 1920×1080 (a 16:9 aspect ratio)
- select another 16:9 frame size such as 1280×720

The smaller frame size will downscale the image and use less bandwidth to transmit.

If you select a frame size that is not the same aspect ratio as your source, the result is one of having a matte (bars) appear around the image, or the image is stretched. See Control the matte (black bars) in the video output for details.

Resizing a video can be more resource intensive rather than leaving the video at a native resolution. Although you can change the resolution at the Lecture Recorder x2 level, it is less of a burden on your system resources if you can change the resolution at the source level. However if that is not feasible, you can download an EDID to the Lecture Recorder x2 to force the source to send a specific resolution. See **Force the video source to use a specific resolution** .

To change the frame size of your video, follow the steps below.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click **Stream Setup**; the stream setup page opens.
4. Scroll to the frame size parameter.
5. Deselect **Use current signal resolution** as frame size, if it is selected.

6. Choose a resolution from the links on the right, or type a frame size into the **Frame size** fields.
7. Click **Apply**.

The final frame size can be larger when Picture in Picture layouts are used.

Control the matte (black bars) in the video output

By default, the Lecture Recorder x2 makes sure that the aspect ratio of input signals is preserved when the output is streamed. If an input video signal doesn't match the encoded frame aspect ratio, bars are added to the sides or top and bottom of the encoded stream when the output is streamed and recorded. The color of the bars is defined by the Background color selected on the Stream Setup page. See Select the background color for your channel.

For example:

- Input signal resolution is 720×480 (a 3:2 aspect ratio)
- encoded resolution is 640×480 (a 4:3 aspect ratio that is narrower than the input resolution)

Borders are added to the top and bottom of the image to preserve the wider ratio of the input.

For example:

- Input signal resolution is 720×480 (a 3:2 aspect ratio)
- encoded resolution is 1280×800 (a 16:10 aspect ratio that is wider than the input resolution)

Borders are added to the left and right of the image to preserve the narrower ratio of the input.

The left and right side border are not guaranteed to be of equal width.

If you are seeing bars on your image but would rather have the image fill the whole screen you have to options:

1. Change the output frame size to match the aspect ratio of the input.
2. Stretch the image to fit the output frame size aspect ratio.

These two options are described below.

Match the output frame size to the aspect ratio of the source signal

To change the output frame size to match the aspect ratio of the source:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the channel's **Stream Setup**; the stream setup page opens.
4. Scroll to the frame size parameter.
5. The simplest option is to select **Use current signal resolution** as frame size and click **Apply**. You can alternatively select it briefly to note the current video signal resolution, then deselect it and follow the steps below.

6. Look for the source aspect ratio in the list of aspect ratios provided.

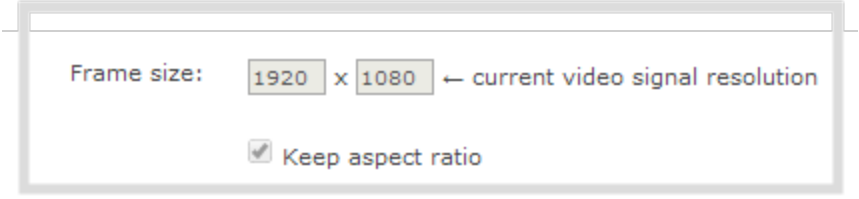
   a. If the source resolution is on the list, choose another resolution on the same line (i.e. with the same aspect ratio).
   b. If the source resolution is not on the list, use a calculator to get a factor of the source resolution and enter it in the **Frame size** fields.

7. Click **Apply**.

Stretch the image

To remove the matte (black bars) by stretching the image to fit your output frame size:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream Setup**; the stream setup page opens.
4. Deselect **Keep aspect ratio**.



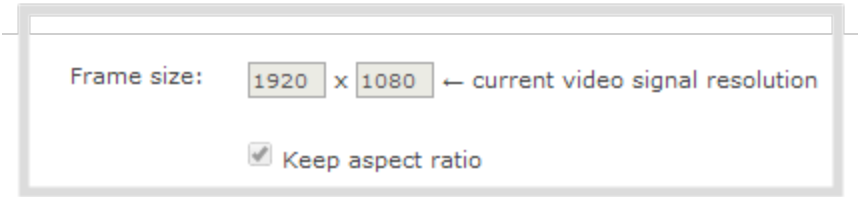
5. Click **Apply**.

Unstretch the output video

By default, the Lecture Recorder x2 makes sure that the aspect ratio of input signals is preserved when the output is streamed. If this default was overridden or if the channel was created in a version of the software earlier than 3.11.0, the image is stretched to match the output frame size. The effect may be subtle and may not be problematic for you, but if you want to resolve this it is very simple to do.

To preserve the source aspect ratio:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream Setup**; the stream setup page opens.
4. Select **Keep aspect ratio**.



5. Click **Apply**.

Unstretching the image causes a matte (black bars) to appear on the sides or top and bottom of the output. To remove these see **Control the matte (black bars) in the video output**.

Limit the frame rate

Limiting the frame rate sets a frame rate value that is lower than the maximum frame rate at which the device can encode images (the maximum is 30). Reducing the frame rate reduces the number of images captured by the device and reduces bandwidth usage.

The device's ability to maintain a set frame rate is based on several factors, for example:

- overall system load affects the ability for the device to process pixels;
- available bandwidth;
- the resolution value;
- the type of motion that is captured; and
- number of users accessing the stream.

When adjusting the frame rate, you may need to try different values to achieve the best outcome. The following table provides the performance expectations when typical settings are used.

Table 16 *Performance expectations*

Setting	H.264	MPEG
Resolution	1920×1200	1920×1080
Video encoding preset: Quality	25-26 fps	13 fps
Video Encoding preset: Speed	27-28 fps	17-18 fps

To change the frame rate:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream setup**; a Stream setup page opens.
4. Enter a value in the Limit frame rate field.
5. Click **Apply**.

Adjust key frame interval

The key frame interval feature specifies how often a key frame (a frame that contains all the pixels) is used when streaming the video. This setting also impacts how quickly a video moves through the frames when a viewer uses the search function of their media player.

Increasing the number of seconds between key frames can significantly reduce your bandwidth and system resource usage with minor impact to your video quality. A good rule of thumb is to keep the interval between 2 to 3 seconds and decrease the key frame interval as the motion increases. Try different settings and note changes in the video quality. If your video quality is poor and jittery you may need to decrease the interval between key frames. If you have unlimited bandwidth and system resources you can choose an option to stream key frames only.

To adjust the key frame interval:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream setup**; a Stream setup page opens.
4. Scroll to the **Key frame interval** drop-down menu. Choose the number of seconds before the system streams a key frame.

Choosing Key frames only option increases bandwidth and system resource usage.

3-3 Customize your channel

Adding a corporate logo, company information, corporate color and time stamps are easy ways to identify your broadcast. This section describes the following topics for customizing your channel:

- Add your logo and company information to your channel
- Add a time stamp to your channel
- Select the background color for your channel

Add your logo and company information to your channel

This section describes the following topics for uploading the logo file, applying the file to a channel and adding presentation and company related information:

To upload a logo to a channel:

To apply company information and logo to a channel

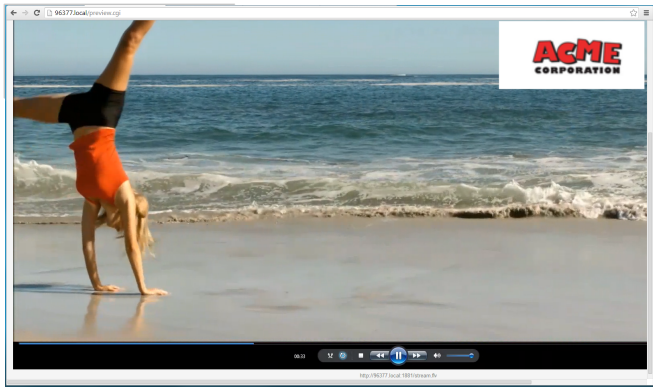
To add a no signal image to a channel

To remove a logo or no signal image from a channel

To remove metadata from a channel

To upload a logo to a channel:

You can easily customize your broadcast and display information to your viewers.

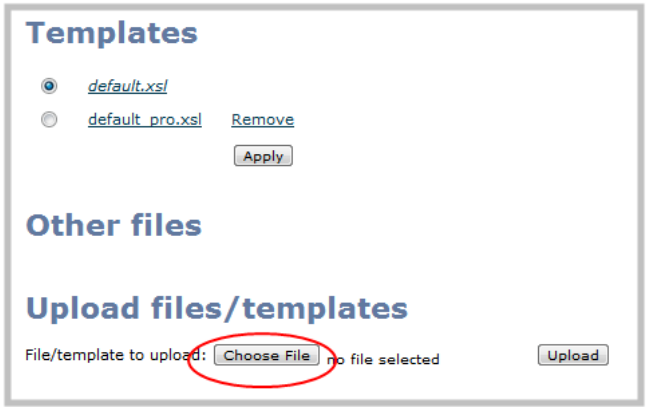


Using the Branding feature, you can also specify the following meta data that the media player displays for your viewers:

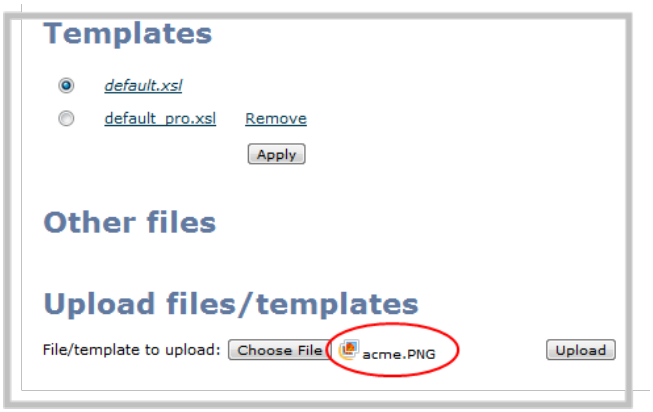
- title of the presentation;
- company logo;
- company website;
- presenter's name;
- copyright date or other labels such as proprietary information, preliminary etc; and
- additional information about the broadcast, such as time of the broadcast, or change to the schedule.

Transparency is not supported for logo image.

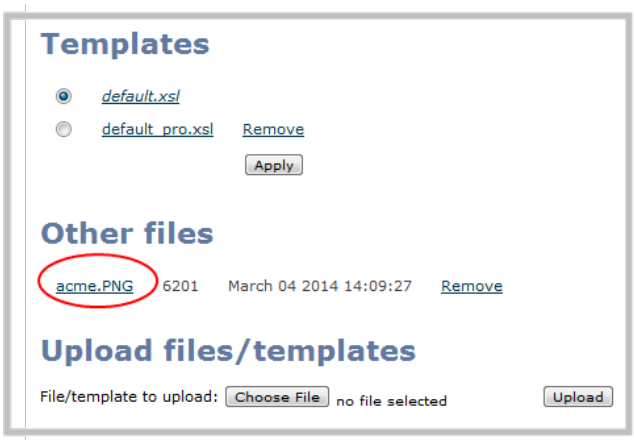
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, select a channel, the menu expands.
4. Click on the **Branding** menu option; the configuration page opens.
5. From the web interface, click on the **Branding** menu option; the configuration page opens.



6. Click **Choose File**; a browser page opens.
7. Navigate to the folder on your admin computer that contains the logo.
8. Select the file, the following file formats are supported: PNG, TIFF, JPEG.
9. Click **Open**; the file is added to the File/template to upload field.



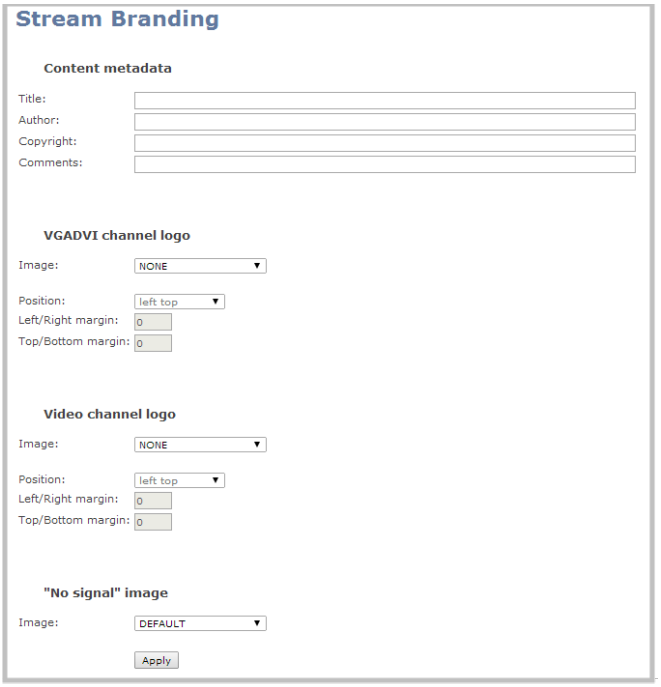
10. Click **Upload**; the file is uploaded and displayed in the Other files section.



11. Now you can apply the logo to a stream as well as add metadata information such as presentation title, presenter's name, and other corporate information.

To apply company information and logo to a channel

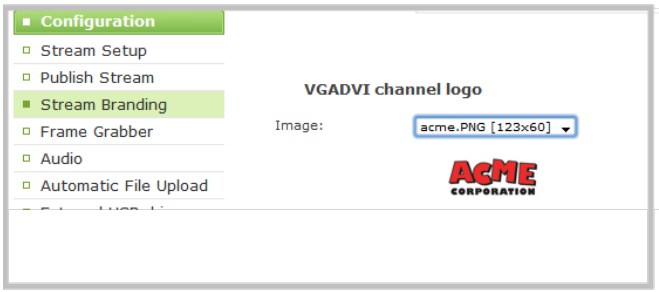
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, select a channel; the menu expands.
4. From the web interface, click on the **Stream Branding** menu option; the Stream Branding configuration page opens.



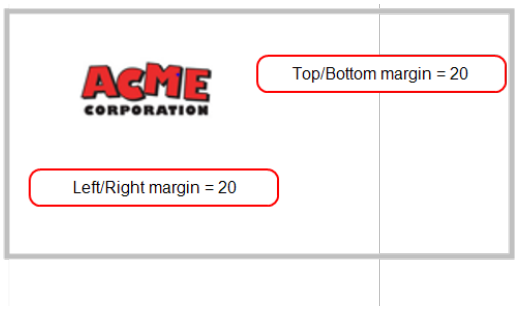
5. Enter metadata such as: presentation title, presenter name(s), any copyright dates and additional information about the broadcast that you want the viewer to know.

> How metadata is displayed depends on the media player. For example VLC stores the metadata in a media information file, while other media players scroll the text horizontally from right to left along the bottom of the media player window, similar to a ticker message bar.

6. Perform the following steps for each broadcast channel (VGADVI or Video). If your broadcast layout is picture in picture you may choose to add the logo to the VGADVI one stream only, or create a pared down version for the video stream.
7. Click on the **Image** drop-down menu; a list of files appears. These are the files that you uploaded earlier in an earlier procedure.
8. Choose a file. A sample of the image appears in the page.



9. Select where the image appears on the broadcast page using Position and Margin values.
    a. Choose a corner of the broadcast page where the image is placed:
        - left /right top
        - Left/ right bottom
    b. Choose how far you want the image from the margin. For example if you chose the starting position of left top and you want the image closer to the center of the broadcast page, enter margin values to move the image.



If location settings are incorrect and display only part of the image; the system overrides the incorrect settings and displays the whole image.

10. Click **Apply**.

To add a no signal image to a channel

This image is displayed for the channel when a signal is not detected. Setting this feature lets you communicate broadcast information to your viewers. For example if a viewer logs in early, or if you are experiencing delays.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, select a channel; the menu expands.
4. Click on the **Stream Branding** menu option; the Stream Branding configuration page opens.
5. From the web interface, click on the **Stream Branding** menu option; the Stream Branding configuration page opens.
6. Choose a "No signal" image. This image is displayed for the channel when a signal is not detected.

7. Click **Apply**. Go to the live broadcast page to confirm the message location on the broadcast page.

To remove a logo or no signal image from a channel

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click on the **Branding** menu option; the configuration page opens.
4. From the web interface, click on the **Branding** menu option; the configuration page opens.

5. Click **Remove**; a confirmation dialog box opens.
6. Click **OK**; the dialog box closes and the image file is removed from the configuration page.

To remove metadata from a channel

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click on the **Stream Branding** menu option; the Stream Branding configuration page opens.
4. Scroll to the Content metadata section.

5. Click the Author, Copyright or Comments field.
6. Highlight the text and press delete on the keyboard. The field is empty.
7. Click **Apply**.

Add a time stamp to your channel

Adding a date and time to your video is an easy way to confirm that the information that you are streaming is current.

To add a time label or timestamp your video:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click **Stream Setup**; a Stream setup page opens.
4. Scroll to Show time label.
5. Choose one of the following:

a. Type a date or time in the field; or

b. Click **Show substitutions**; a list of options appears, from the list choose the format you want to date to appear on the recording and type in the specific date and time. The following table describes the values.

Table 17 *Time Format options*

Field	Value	Example
date	%F	2012-01-26
year	%G	2012
month (01)	%m	01
month (Jan)	%b	Jan
month (January)	%B	January
day of the month	%d	26
weekday (Thu)	%a	Thu
weekday (Thursday)	%A	Thursday
time	%T	08:40:45
hour	%k	08

Field	Value	Example
minute	%M	40
second	%S	45
millisecond	%#m	378

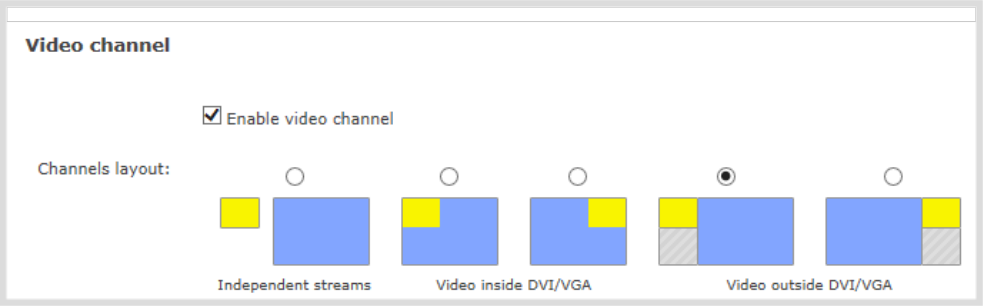
8. Click **Apply**.

Select the background color for your channel

When you choose picture in picture layout with the video channel outside the DVI/VGA channel, you can select the background color to fill the unused space. For example you can add your corporate color scheme.

To add a background color:

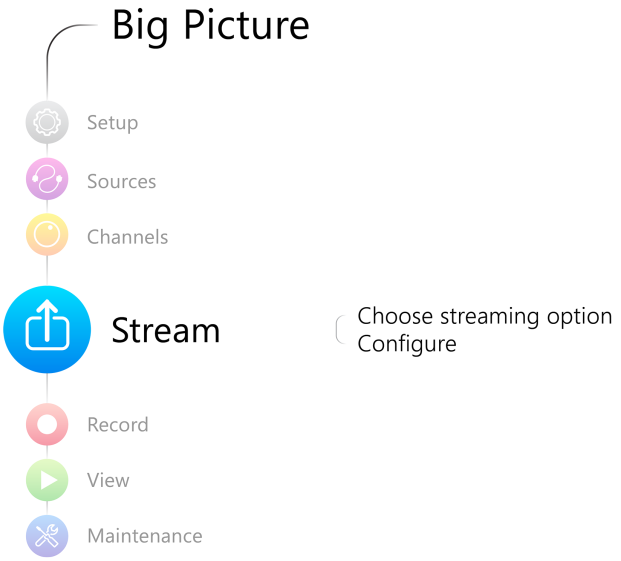
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click on the Stream Setup menu option; the stream setup window opens.
4. Scroll to Video channel. Picture in picture layout options are available when both VGADVI and Video channels are enabled.
5. Choose a layout with video outside of the DVI/VGA channel.



6. Scroll to **Common settings**.
7. Choose a color from the **Background color** drop-down menu.
8. Click **Apply**; color is added to the unused space.

PART 4: Stream

Streaming provides powerful and flexible approaches to delivering to your users. Offering an easy to use interface, users can stream video using multiple formats to multiple users and devices such as web browsers, media players, set-top-boxes, Smart TVs and Content Distribution Networks. The tool's flexibility is further enhanced by its ability to support standard codecs used by most sharing destinations and media players.



This section discusses the following topic related to publishing your content:

- Stream your video
- Samples of stream settings

4-1 Stream your video

After you have configured your media and channels, decided on the content and layout of your broadcast, it's time to share your broadcast. The following sections provide a description of the available streaming options, insight into why you would choose each option, and procedures to stream your content using each option.

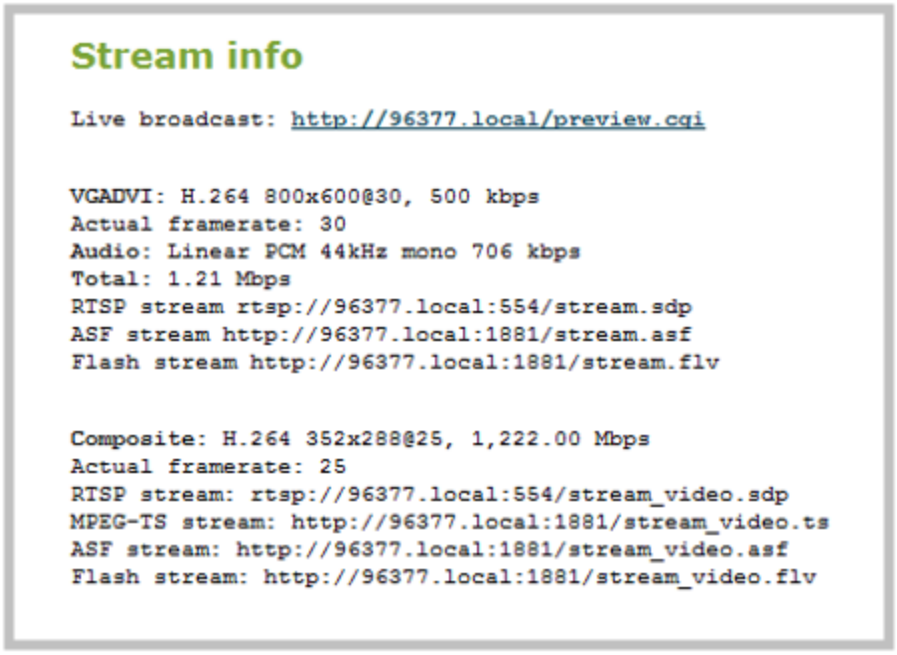
- View available video formats
- Choose a streaming option
- Retrieve stream URLs
- Configure streaming ports
- Stream content using HTTP or RTSP
- Stream your video
- Stream content using a Content Distribution Network
- Stream content using multicast streaming
- Stream content using UPnP

View available video formats

When you select video and audio codecs for streaming, the system generates and displays a list of available video formats and standards specific to the selected codec.

To view the video formats and standards specific to your selected codec:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Info menu option. The following page opens displaying the stream protocol that is supported based on the selected codecs.



Addresses and files for streaming the DVI channel
Copy, paste and share files and addresses with viewers

Addresses and files for streaming the video channel
Copy, paste and share files and addresses with viewers

Choose a streaming option

Each method of streaming media has strengths and weaknesses depending on your audience location, hardware resources and bandwidth. To help you to decide how to publish your content, you must first identify the number of viewers and how viewers will access your content. Are you streaming live video, or recorded video. Do you need to stream the content to one client (peer-to-peer), deliver a single stream to multiple clients (multicast), or provide web-based streaming where multiple clients can access the broadcast (Content Distribution Network).

The following table gives you a brief outline of the distribution options. A procedure to configure each distribution option follows the table.

Publishing Options	Use this option to...
HTTP	Quickly stream content to viewers simultaneously. No set up is required. The Lecture Recorder x2 is ready to stream content as soon as it is has power and an input signal. No other settings are required. Your audience need only access the URL of the broadcast and they are instantly connected. This viewing method is ideal for a small number of viewers since streaming uses your system resources and bandwidth. However a small amount of overhead is used for each viewer. For more information about using a HTTP streaming, refer to Stream content using HTTP or RTSP.
RTSP	Quickly stream content to viewers. No set up is required. The Lecture Recorder x2 is ready to stream content as soon as it has power and an input signal. No other settings are required. Your audience need only copy and paste the URL of the stream into a media player. For more information about using a RTSP and HTTP streaming, refer to Stream content using HTTP or RTSP.

Publishing Options	Use this option to...
Content Distribution Network	Stream web content to many viewers simultaneously to any geographical location. A viewer accesses the broadcast from a website using a user name and password, if required. Using a CDN to host your broadcast is highly scalable and makes financial sense to website owners since you do not pay for additional server hardware or routing should your network traffic increase or decrease. Using a CDN to stream live content allows you to reach a large geographically diverse audience and because CDNs perform format conversion, the stream is platform independent. For more information about streaming to a CDN, see Stream content using a Content Distribution Network. The following options are available to stream video to a CDN: **Epiphan TV** - test your video stream using Epiphan's portal **using RTSP announce** - stream live video to a content delivery network **using RTMP push** - stream live video to a content delivery network RTSP and RTMP streaming provides the following advantages: • viewers can watch the action as it unfolds; • video quality automatically changes to adjust to changes in bandwidth; • reduced bandwidth usage since the player maintains a smaller buffer; and • viewers can scroll back through later sections of the video while the video is streaming.

Publishing Options	Use this option to...
Multicast Streaming	Stream content to a multicast IP address where it can be shared with multiple viewers within the same LAN. All viewers receive the same stream at the same time. Similar to turning on a radio station, all listeners hear the same music at the same time. This delivery method relies on network equipment that supports multicasting and is usually used in high bandwidth corporate LANs and not on Internet-based architectures. This delivery method is useful for training sessions, when there is a specific timeframe when the audience will view the content. For more information about using multicasting for streaming your content, see: Stream content using multicast streaming • RTP/UDP transport standard is used to stream H.264 video when unicast or multicast streaming is used. Each viewer retrieves an SDP file. SDP files can be stored on a streaming server, or opened by a media player. For multicast, the destination address is • MPEG-TS UDP transport standard is used to stream MPEG-4 video when unicast or multicast streaming is used. Each viewer retrieves a UDP address to add to their media player. • MPEG-TS RTP/UDP transport standard is used to stream video when a single port is used to stream video and audio via unicast or multicast. Each viewer retrieves a RTP address to add to their media player. This option can be used to stream video and audio to an IP TV or set top box playlist.

To stream video outside of your LAN, use a CDN or configure port forwarding on your router. Refer to your Network Administrator; network configuration is beyond the scope of this guide.

The Publish Stream feature is available when the H.264 codec is set.

Retrieve stream URLs

The quickest and simplest way to deliver your content is to send the broadcast's URL to your viewers. You can provide separate URLs for each channel being streamed. Alternatively, one URL can be provided that includes all streams from all input sources. The format of the URL depends on the method you used to access the device, either through network discovery using the serial number or IP address.

Serial URLs must be on the viewer's LAN for the viewer to use this option.

Table 18 *URL options*

Access Method	URL Format
serial discovery	http:// (or rtsp://)<s/n>.local:**** s/n is the serial number of the device
IP address	http:// (or rtsp://)***.***.***.***:****

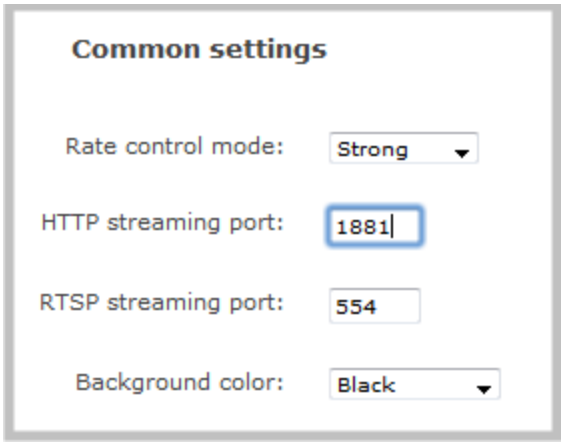
Configure streaming ports

For HTTP or RTSP streaming the only information required to view the broadcast is the URL and the port number used to stream the broadcast. Ensure each channel has a unique HTTP and RTSP port number and that the port number is not already being used.

When a channel layout is configured as independent streams, the following values are used for both streams.

To set the HTTP and RTSP streaming ports, follow the steps below.

1. From the web interface, click **Stream Setup**; a Stream setup page opens.
2. Scroll to Common settings.



3. Set the HTTP Streaming port to specify the port used to stream the HTTP broadcast. This value along with the URL is used by viewers to access the broadcast.

The port number must be higher than 500 for HTTP. In the case of RTSP streaming this value is ignored.

4. Set the RTSP Streaming port when you are streaming live video. This value along with the URL is used by viewers to access the broadcast. The default is 554.
5. Click **Apply**.

Stream content using HTTP or RTSP

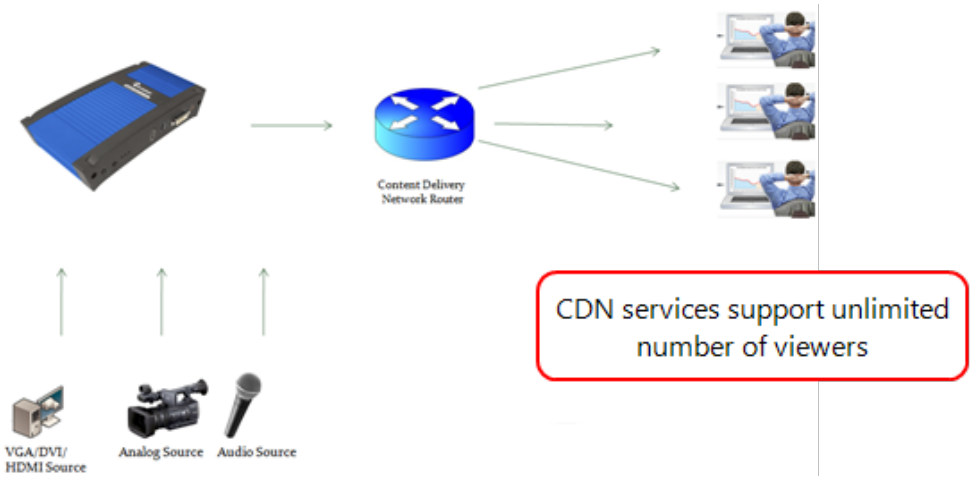
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
5. From the web interface, scroll to the Info menu option. The Info page for the device opens.

6. Jot down the URL address. This is the address you can send to viewers or to create a link to your broadcast.

Users must install Bonjour Print Services on their Windows or Mac computer to access the live Preview using the serial number. Log into the admin interface by IP address to see the URL with the IP address instead of the serial number.

Stream content using a Content Distribution Network

A Content Delivery Network relies on geo-diverse CDN servers to receive and disperse web content to the CDN server closest to the user. The closer the server is to the user the faster the content is delivered. Streaming your content through a CDN allows you to stream any time, anywhere, regardless of the viewing device.



You can test how your content is streamed by sending your content to Epiphan's CDN or choose one of Epiphan's preferred CDN providers **http://epiphan.tv/cdn-partners.php**.

Test content distribution using Epiphan CDN

Epiphan.tv is a service provided by Epiphan to help our customers to experiment with content distribution networks, bandwidth, performance limits and viewer limits are applied. To upgrade to a full service, select one of Epiphan's preferred CDN provider at **http://epiphan.tv/cdn-partners.php**.

To hear audio content from Epiphan TV ensure audio is set to MP3 in stream setup configuration.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option. The Publish Stream page opens.
4. Click the **Publish** drop-down menu.
5. Choose to <serial>. Epiphan.tv.

   Where <serial> is the serial number of the device.

6. Click **Apply**; connection through the media tunnel is established. The system streams to the Epiphan's portal – epiphan.net.

You must set audio format to MP3 when streaming through epiphan.net, see **Select an audio codec**.

View content from Epiphan TV

To view content from Epiphan TV ensure you have:

- a current browser;
- a current flash player;
- set H.264 codec in stream setup configuration; and
- set stream bitrate lower than 500 kbits/s in steam setup configuration.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option; the Publish Stream page opens.
4. Click the link to view the broadcast.

5. A new page opens displaying the broadcast.

Specify a multimedia player to view your Epiphan TV broadcast

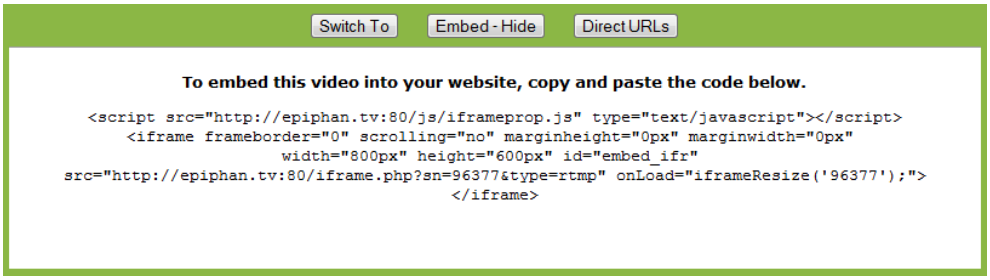
1. From the Epiphan TV portal, click **Switch To** on the bottom of the screen; the following options appear.

2. Choose a plug-in from the list, the stream is displayed using the selected multimedia player.

Add a link to your website to stream your Epiphan TV broadcast

Follow the steps below to embed code for the broadcast in a web page.

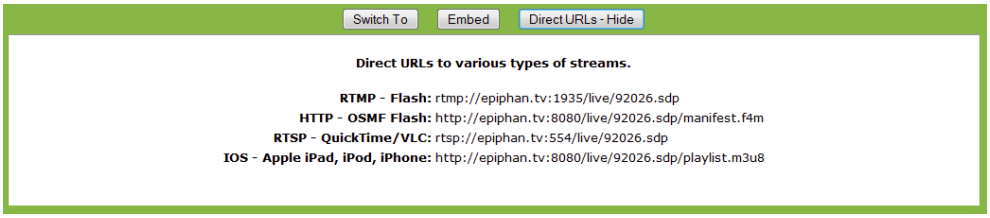
1. Go to the Epiphan TV portal.
2. Click **Embed** on the bottom of the screen; a dialog box opens displaying the code.



3. Highlight and right-click on the code in the dialog box. A drop-down menu appears.
4. Choose **Copy**.
5. Paste the content into the HTML code for your website. A link to your broadcast on Epiphan TV is added to your web page.

Retrieve a list of addresses based on video stream encapsulation

1. Go to the Epiphan TV portal.
2. Click **Direct URLs** on the bottom of the screen; a dialog box opens displaying a list of URLs for different types of streams.



3. Use the copy and paste function to provide viewers with the URL to view the stream.

Stream content to a CDN provider

Publish to any CDN provider that supports RTSP announce or RTMP push. Both RTSP and RTMP can be used for live streaming, however not all CDNs or media servers support both formats. From this window choose the streaming format that your CDN or media server supports. Epiphan has tested with the CDN providers listed here: **http://epiphan.tv/cdn-partners.php**. Contact your CDN for a list of supported audio codecs and update the stream setup configuration.

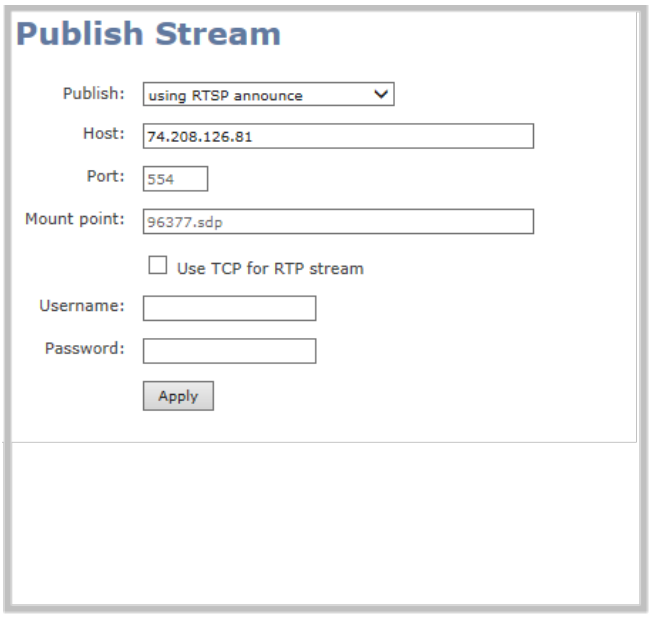
To publish content to a CDN provider ensure you have:

- a path to the mount point (provided by the CDN provider);
- verify which transport protocols your CDN supports:
- a current flash player; and
- set H.264 codec in stream setup configuration.

To stream content to a CDN using RTSP announce

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option. The Publish Stream page opens.
4. Click the **Publish** drop-down menu.

5. Choose **using RTSP announce** from the drop-down menu.



6. Enter the host name or IP address of the CDN or media server.
7. Enter the port number which is used for streaming to the server. Usually for RTSP streaming the value is 554.
8. Enter a value in the **Mount Point** field. This is the full path to the location of the live steam or the media server. The path starts with the application name. The path is provided by the CDN provider.
9. Check the **Use TCP for RTP stream** checkbox. Verify which transport protocols your CDN provider supports.
10. Enter a user name and password.

> The CDN provider assigns a user name and password to authenticate the publisher. Contact the CDN provider for your log in credentials.

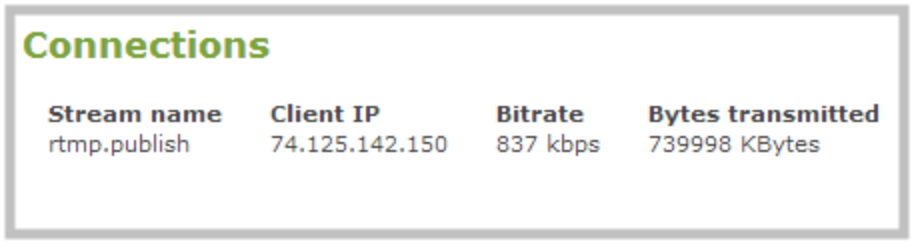
12. Click **Apply**.

To stream content to a CDN using RTMP push

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option. The Publish Stream page opens.
4. Click the **Publish** drop-down menu.

5. Choose **using RTMP push** from the drop-down menu.

3. Enter the host name or IP address of the media server or CDN.
4. Enter the port number which is used for streaming to the media server or CDN. Usually for RTMP streaming the value is 1935.
5. Enter a value in the **Mount Point** field. This is the full path to the location of the live steam or the media server. The path starts with the application name. The path is provided by the CDN provider. The RTMP publish stream is displayed as rtmp.publish in the Connections window.



3. Enter a user name and password.

The CDN provider assigns a user name and password to authenticate the publisher. Contact the CDN provider for your log in credentials.

4. Click Apply.

Stream content using multicast streaming

A multicast stream consists of one stream distributed to many viewers via a multicast-capable network. Lecture Recorder x2 supports the following multicast streaming options:

• Using RTP/UDP push

• Using MPEG-TS UDP push

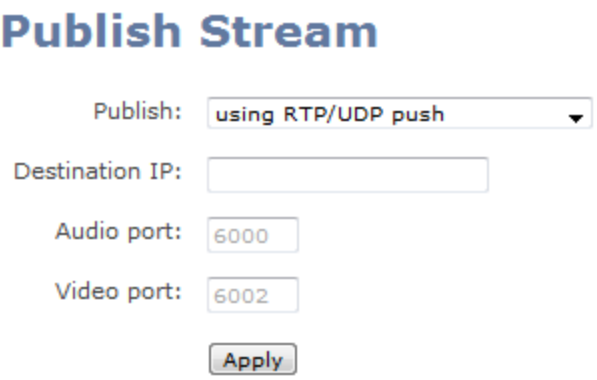
• Using MPEG-TS RTP/UDP push

Lecture Recorder x2 supports multicast streaming content to an IP TV or a set-top box playlist when the file format is MPEG-TS. The following procedures outline the steps to distribute your content using multicast streaming.

When Independent Stream layout is configured the DVI Channel supports multicast streaming. The Video channel is not streamed.

Multicast streaming using RTP/UDP

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option. The Publish Stream page opens.
4. Click the **Publish** drop-down menu.
5. Choose **using RTP/UDP push**.



6. Enter the destination multicast IP address.
7. Enter the port number through which the audio will stream.
8. Enter the port number through which the video will stream.

Both audio and video use adjacent ports (port and port+1). The minimum distance between audio and video ports should 2.

9. Click **Apply**; an SDP file is generated and available from the Info menu option of the web interface.
10. Select a name and location for the SDP file and save it.
11. Share the link to the file with viewers.

Multicast streaming for MPEG-TS file format using UDP push

To configure the MPEG-TS stream, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, click the **Publish Stream** menu option; the Publish Stream page opens.
4. Click the **Publish** drop-down menu.
5. Choose **using MPEG-TS UDP push**.

6. Enter the destination multicast IP address where the broadcast can be viewed.

A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

7. Enter the destination port number through which the media will stream.
8. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
9. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media players.
10. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.
11. Enter a channel number in the **Channel number** field to identify your stream in the media player.

When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

12. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
13. Click **Apply**. To view the stream, open the URL in a media player, for example:

    udp://@ip:port or in the case of the sample configuration in the figure shown above:

    udp://@226.10.24.32:7000

    To view the stream when SAP announce has been set and the stream is advertised from a media player, set-top-box or Smart TV, refer to Viewing with SAP Announce.

Multicast streaming for MPEG-TS file format using RTP/UDP push

To configure the MPEG-TS stream, ensure the following codecs are configured:

- Video – H.264
- Audio – MP3 or AAC, if audio is configured.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. From the web interface, scroll to the Publish Stream menu option. The Publish Stream page opens.
4. Click the **Publish** drop-down menu.
5. Choose **using MPEG-TS RTP/UDP push**.
6. Enter the destination multicast IP address where the broadcast can be viewed.

> A IPv4 multicast address range is an address between 224.0.0.0 to 239.255.255.255. Contact your System Administrator for the specific address to use.

7. Enter the destination port number through which the media will stream.
8. Perform one of the following:
    a. If you do not want to advertise your stream to a media player over a local network, go to the last step of this procedure; or
    b. To advertise your stream to a media player over a local network, follow the steps below.
9. Enable the **SAP announcement** checkbox to advertise your stream over a local network. When the checkbox is enabled and a multicast IP address is configured, your stream is displayed in the playlist of local media player.
10. Enter a multicast IP address in the **SAP announcement IP** field. If your media player is configured to receive multicast streams from an IP address that is different from the default address 224.2.127.254, you may need to contact your system administrator for a specific multicast IP address.
11. Enter a channel number in the **Channel number** field to identify your stream in the media player.

> When a channel number value is not specified, viewers cannot select a channel from the set-top box or Smart TV .

12. Enter a name for a group of streams in the text box next to **Group name**. Since media players simply present a list of available streams, you can organize your streams into multiple folders or in cases where folders are not displayed, use dot separator hierarchy to help your viewers filter out unwanted streams by category.
13. Click **Apply**.
14. Click the **Info** menu option of the web interface. An Info page opens displaying stream information.

    To view the stream from a media player, open the URL in a media player, for example:

rtp://@ip:port or in the case of the sample configuration in the figure shown above:

rtp://@226.10.24.32:7000

To view the stream when SAP announce has been set and the stream is advertised on a media player, set-top-box or Smart TV, refer to Viewing with SAP Announce.

Stream content using UPnP

Using the Universal Plug and Play (UPnP) networking protocol, your Lecture Recorder x2 can be discovered and can stream to software and hardware media players, set-top-boxes and Smart TVs with ease. If UPnP is enabled, the device automatically establishes communication with media players on the network.

UPnP uses MPEG-TS over HTTP with the H.264 codec and MP3 or AAC audio encoding (or no audio). You can only access live streams or recordings that meet these requirements.

For security reasons the default behavior prevents UPnP access to live streams and recorded files.

This section covers the following topics:

- Enable UPnP
- Disable UPnP
- Stream your video
- Auto-restart playback to a UPnP Device
- Change UPnP device name

Some players will not be able to access the stream or saved recordings if a view password is set. If needed, see **Removing User Passwords** to clear the viewer password.

The topics in this chapter include how to enable and disable UPnP and how to control media players from the Lecture Recorder x2. To choose recordings or live streams from your media player, see Viewing with UPnP .

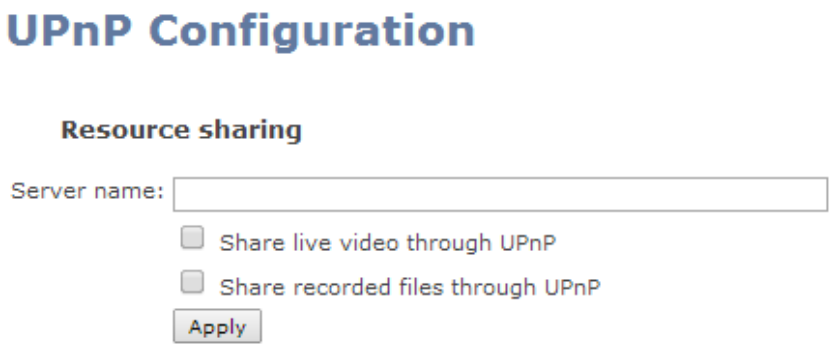
Enable UPnP

Enable UPnP to allow digital media players on the network to browse for media or live streams from your device.

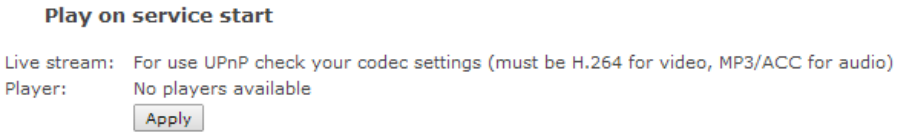
Streams and MPEG-TS recorded files must use the supported codecs: H.264 with MP3 or AAC audio. Having a viewer password could prevent the ability to use UPnP.

To enable UPnP:

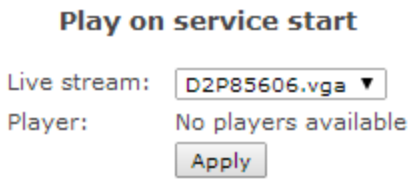
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.



4. Enter a name in the **Server name** field. If no name is provided the server name will be the device's serial number.
5. Select whether you want to share live video and recorded files.
6. Click **Apply**.
7. If no live stream is available that meets the criteria for UPnP, a message is displayed in the **Play on service start** section of the page.



8. Otherwise, the Play on service start section shows a drop-down list of what can be streamed.



You can now browse for your server from your digital media player. See below.

Disable UPnP

By default, UPnP sharing is disabled. If you enabled it for a particular broadcast, you may want to disable UPnP sharing after the broadcast is complete. You can choose to disable access to live streams, recorded files, or both.

To disable UPnP:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Deselect **Share live video through UPnP** to stop sharing live video.
5. Deselect **Share recorded files through UPnP** to stop sharing recorded files.
6. Click **Apply**; UPnP sharing is disabled.

Play directly to a media player

If your digital media player is UPnP enabled, the Lecture Recorder x2 can play direct the media player to play recorded files, without browsing through menus in the player.

Recorded files must be in MPEG-TS format and use the supported codecs: H.264 with MP3 or AAC audio. Having a viewer password could prevent the ability to use UPnP.

To play directly to a media player:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Ensure **Share recorded files through UPnP** is enabled on your Lecture Recorder x2. (See Enable UPnP.)
4. Go to the recorded files list. (See View the List of Stored Files.)
5. From the list of files, select the file you want to play and click on the **Play To** icon for the file; a list of visible digital media players is displayed.
6. Select a media player; the recording plays on the screen(s) connected to the media player.

Auto-restart playback to a UPnP Device

In unmanned situations such as industrial applications and digital signs, it is useful to automatically have a stream played to a digital media player, even if the Lecture Recorder x2 restarts.

To configure auto-restart of a stream to a media player:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Scroll to the Play on service start section.
5. Select a stream to use from the **Live stream** drop-down list.
6. Select a digital media player from the **Player** drop-down list.
7. Click **Apply**.

Only a single stream and player combination can be configured for auto play.

Change UPnP device name

You can configure the UPnP server name that appears for your Lecture Recorder x2. By default, if you left the server name field blank when enabling UPnP, the server name is the device's serial number.

To change the UPnP server name:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the **UPnP** link in the Configuration section; the UPnP configuration page opens.
4. Highlight and delete the text in the **Server name** field, if any.
5. Type a new server name. Use characters A-Z, a-z, 0-9, _, :, @, ^, #, -. {}, [], ().
6. Click **Apply**; the name changes.

4-2 Samples of stream settings

When choosing your stream settings it is important to consider the stream content. When streaming fast moving video it's best to choose a higher bitrate and frame rate versus streaming a slide presentation where you can save on bandwidth and system processing by lower the bitrate and frame rate. Stream setup is a matter of balancing quality and system resource usage.

To help you to achieve this balance the following tables list the recommended settings when streaming video and slide content from a PC, Mac or tablet.

Streaming video content

The table below provides suggested settings to maximize your video quality while minimizing system resource usage when streaming video content from a PC, Mac or tablet.

Setting	PC and Mac	Tablet
Codec	H.264	Motion JPEG
Video encoding preset	High Speed	High Speed
Video encoding profile	Main	
Enhanced compatibility mode (h.264 slicing for RTP)	Disable for PC Enable for Mac	
Key frame interval	2 sec	
Limit frame rate	30	30
Bitrate	1000 Kbits for SD 2000 Kbits for HD 4000 Kbits for Full HD	
Quality Parameter (available when Motion JPEG is selected)		40
Rate control mode	Balanced	
Audio format	PCM 44 KHz	
Audio channels	Stereo	

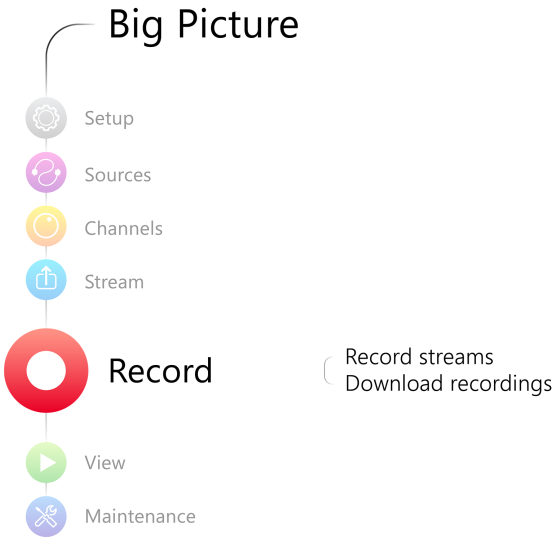
Streaming slide content

The table below provides suggested settings to maximize your stream quality while minimizing system resource usage when streaming slide content from a PC, Mac or tablet.

Setting	PC and Mac	Tablet
Codec	H.264	Motion JPEG
Video encoding preset	High Quality	High Quality
Video encoding profile	High	
Enhanced compatibility mode (h.264 slicing for RTP)	Disable for PC Enable for Mac	
Key frame interval	2 sec	
Limit frame rate	15	15
Bitrate	500 Kbits for SD 1000 Kbits for HD 2000 Kbits for Full HD	
Quality Parameter (available when Motion JPEG is selected)		80
Rate control mode	Balanced	
Audio format	PCM 44 KHz	
Audio channels	Stereo	

PART 5: Record

Your Lecture Recorder x2 encodes the video and audio it captures. If you choose to record the resulting streams, it stores the recorded files on the device and provides a variety of automatic or manual mechanisms to download the files.



This section discusses the following topics related to recording:

- Create Recordings
- File Maintenance
- File and Recording Transfer
- Use the Local FTP Server

5-1 Create Recordings

Your Lecture Recorder x2 can record the encoded stream to a multi-track file.

This section describes the following topics for creating and configuring recordings via the web interface.

- Control recording via the web interface
- Configure the type and length of recording files
- Close the current recording file while recording
- Control recording with the big red button
- Control recording with on-device buttons
- Control recording with a USB keyboard or mouse

See Control with HTTP Commands and Control with RS-232 / Serial Port for information on controlling recordings with third party tools. See File Maintenance to learn how to download the recorded files.

Recording can also be controlled via the tablet interface. See **Control recording via the tablet interface**.

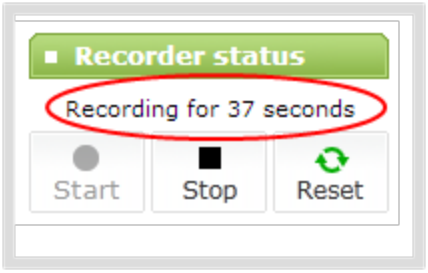
Recording basics

While recording a channel, a new file is created each time the maximum time or size limit is met. When configuring these limits you can choose to have recording stop when there is no signal present in the sources. See Configure the type and length of recording files. This can be very useful to save disk space, but can cause multiple files for a single session if the session involves switching presenters or input types.

Control recording via the web interface

To start and stop recording:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. To Start Recording:
    a. Click the red **Start** button in the Recorder Status section; the recording starts and a timer indicates how long it has been recording.



b. The device continues to record until it is stopped or the device runs out of storage space. The recording is broken into multiple files as needed.

4. To Stop Recording:

   a. Click the **Stop** button in the Recorder status section.

Configure the type and length of recording files

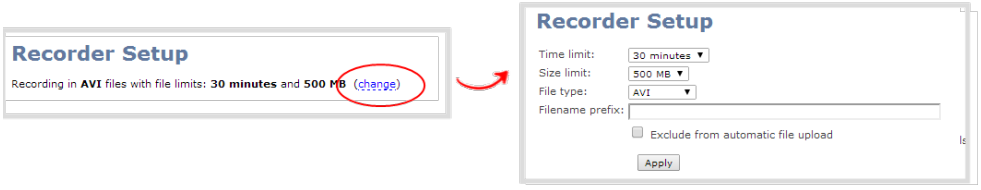
By default recordings are saved as AVI files. When the recording reaches 10 minutes in length or a file size of 100 MB (whichever occurs first), the device closes the current recording file and opens a new one. This is done seamlessly with no loss in recorded data.

You may find it useful to have recordings divided this way for ease of download, but you may also want to change the recording limits to be larger or smaller to meet your individual situation.

Additionally you can configure the prefix for all recordings (the suffix is the date and time of the recording) and you can exclude a channel or recorder's recordings from automatic upload.

To change the recording configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Click the Recorded Files button under Recorder status.
4. Click the **change** link under Recorder Setup; the recorder setup section expands.



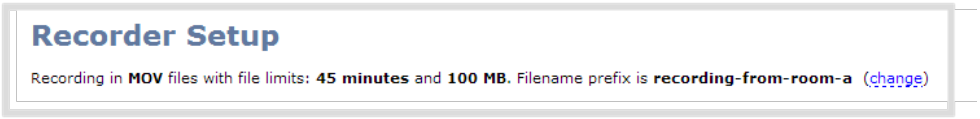
5. Select a time limit for the recording from the **Time limit** drop down.
6. Select a file size limit from the **Size limit** drop down.

Tip: If you don't know what size to select, do some test recordings to get an idea of the file sizes you can expect. If you want to guarantee the recording lasts to a given time limit, select a file size that is far larger than you saw in your tests.

7. Select a file type from the **File type** drop down.
8. If desired, enter a prefix for the recordings. All new recording files for this channel or recorder will be prefixed with the text you enter.

Tip: It's best to avoid spaces in file names. Use underscores or hyphens to separate words.

9. If desired, click the check box to stop recording if are no VGA/DVI or video signals.
10. Click **Apply**; the changes are saved and the recorder setup displays the new configuration.



The table below describes the options available for recording file configuration.

Table 19 *Recording File Configuration Fields*

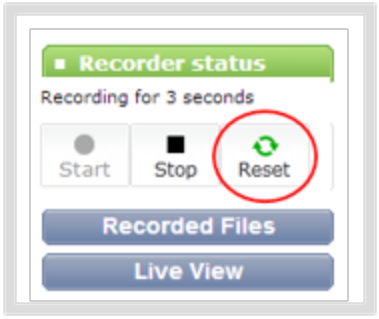
Label	Description / Options
Time limit	Specifies the length of time the device waits before the recording file is saved and a new one is started (assuming the size limit has not yet been reached). Values range from 5 minutes to six hours.
Size limit	Specifies the file size a recording can become before it is saved and a new one is started (assuming the time limit has not yet been reached). Values range from 50 MB to 4 GB.
File type	Specifies the recording file type. Select from AVI, MPEG-TS, or MOV. Choose MPEG-TS for UPnP playback.
Filename prefix	Specifies how the recordings are named. Recording files start with the given prefix followed by the date and time. The channel or recorder name is used if no prefix is given. Allowed characters: A-Z, a-z, 0-9, _, , #, -, [], ().
Stop recording in the absence of VGA/DVI and video signals	Select this if you do not want to record when there is no VGA/DVI or video signal coming into the device.

Close the current recording file while recording

Recording files are automatically saved and new ones opened for writing when they reach the configured time or size limit or when changes are made to the stream. You cannot download files from the device while they are being recorded, so from time to time you may need to close the current recording to facilitate file downloads. The device supports this through the recording reset option, which closes the current recording file and opens a new one without missing any frames.

To close the current recording and start a new file:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.



3. Click the **Reset** button next to the stop button; the current file is stopped and a new one begins.

Control recording with a mouse

You can physically control recording start/stop by connecting a USB mouse to your Lecture Recorder x2.

To control recordings with a mouse:

1. Power on the device.
2. Connect a USB mouse to a USB port on the device.
3. Click the left mouse button once to start recording; recording starts . If desired, check the web interface to see that recording is started.
4. Click the left mouse button again to stop recording. If desired, check the web interface to see that recording is stopped. See View the List of Stored Files

Control recording with the big red button

Your product came packaged with a red button you can use to control recordings. You can connect this to the Lecture Recorder x2 and have a simple way to start and stop recordings, with visual confirmation of recording.

To control recordings with the red button:

1. Power on the device.
2. Attach sources and configure the device.
3. Connect the red button to a USB port on the device.
4. Press the button once to start recording; recording starts and the button lights red, after a few moments it flashes to confirm recording.
5. Press the button again to stop recording; recording stops and the red button light turns off.

Control recording with on-device buttons

The Lecture Recorder x2 has a button on the side of the unit that toggles recording. By default, a single press of this button toggles recording on or off.

To toggle recording on/off with the right on-device button (assuming the button has its default configuration):

1. Power on the device.
2. Attach sources and configure the device.
3. Press the recording button once to start recording; recording starts. If desired, check the web interface to see that recording is started.
4. Press the recording button again to stop recording. If desired, check the web interface to see that recording is stopped. See View the List of Stored Files

The Lecture Recorder x2 gives you the opportunity to change this button behaviour. You can disable the button or make use of both buttons if you wish.

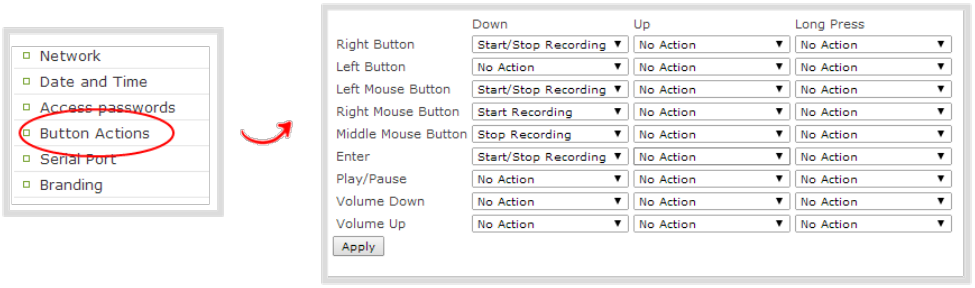
To disable the button and prevent accidental control of the recording:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select **Button Actions**in the Configuration section; the button action configuration page is displayed.
4. Pick **No Action** from the drop-down lists for **Down**, **Up**, and **Long Press** for **Right Button**.
5. Pick **No Action** from the drop-down lists for **Down**, **Up**, and **Long Press** for **Left Button**.
6. Click Apply.

When configuring one button to start recording and the other button to stop recording, set the Down actions for the appropriate buttons. Down action is chosen so the recording starts or stops as soon as the button is pressed, avoiding any delay that may happen before the button is released.

To configure a start recording and stop recording button:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select **Button Actions** in the Configuration section; the button action configuration page is displayed.



4. Pick **Start Recording** from the **Down** drop-down list for **Right Button** (or Left Button if you prefer to have the left button start recording).
5. Pick **Stop Recording** from the **Down** drop-down list for **Left Button** (or Right Button if you set the left button to start recording.)
6. Click Apply.

Control recording with a USB keyboard or mouse

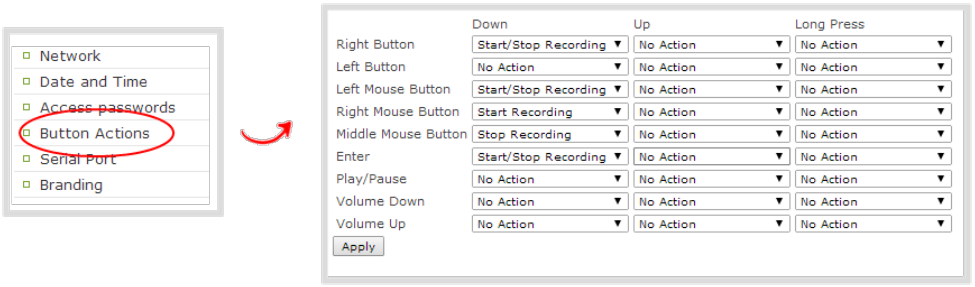
In addition to using the red button or on-device buttons to toggle recording, you can set up custom configurations that determine how an attached USB keyboard or mouse works to control recordings. By default the left mouse button or the keyboard Enter key toggles recording in the same way as the default on-device button behaves. Press and release the button or key once to start recording and again to stop.

The device supports keyboards with media buttons such as Play/Pause and Volume Up/Down or a mouse with up to three buttons.

When configuring the mouse or keyboard for recording, set the **Down** actions. Down action is chosen so the recording starts or stops as soon as the button or key is pressed, avoiding any delay that may happen before the finger is released.

To configure a start recording and stop recording button:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select **Button Actions** in the Configuration section; the button action configuration page is displayed.



4. Pick **Start Recording** from the **Down** drop-down list for the desired mouse button or keyboard key (from Enter, Play/Pause, Volume Up, or Volume Down).
5. Pick **Stop Recording** from the **Down** drop-down list for the desired mouse button or keyboard key (from Enter, Play/Pause, Volume Up, or Volume Down).
6. Click Apply.

5-2 File Maintenance

The Lecture Recorder x2 has a finite amount of storage. By default, the device has 16 GB of storage. Though this storage space holds a lot of recordings, it will eventually run out of space if recordings are added but never removed. When this happens, the device deletes the oldest recorded files to make room for new recordings.

You can use a variety of methods to automatically transfer files from the device to local network storage. Alternatively you can manually select individual recordings to transfer or delete. This section discusses the following manual file management topics.

- View the List of Stored Files
- Rename Stored Files
- Download Files Manually
- Delete Files Manually

For information on automatic file transfers, see File and Recording Transfer.

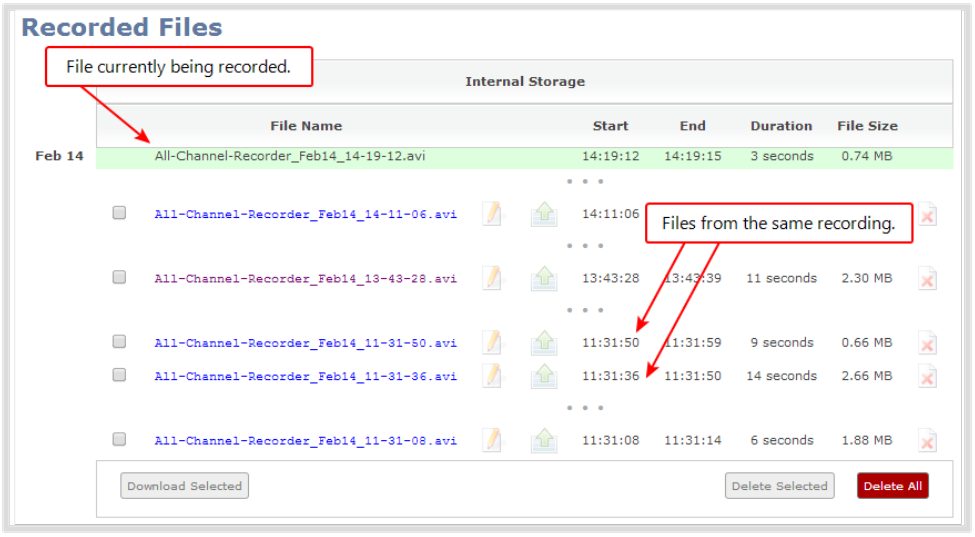
View the List of Stored Files

To view the recordings on the device:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. Click **Recorded Files** button under Recorder status.
4. If there are no files:
    a. A message indicates there are no recorded files.

5. Otherwise:
    a. All files for this channel are listed, sorted by date.

    Files that are part of the same recording session are listed one after another. Three dots appear between files of different recording sessions. The file currently being recorded (if applicable) is shown at the top of the list. It cannot be modified or downloaded until it has finished recording.

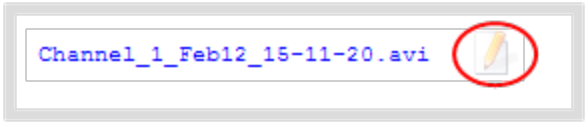


Rename Stored Files

Recording files are named based on the filename prefix specified during configuration. See Configure the type and length of recording files for more details about setting prefixes.

To rename recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Go to the list of recorded files. See View the List of Stored Files.
4. Select the pencil and paper icon next to the filename you wish to change.



5. Type the new file name and press enter when finished.

The web interface keeps track of the filename extension (i.e. .avi) so you do not need to include it when renaming the file.

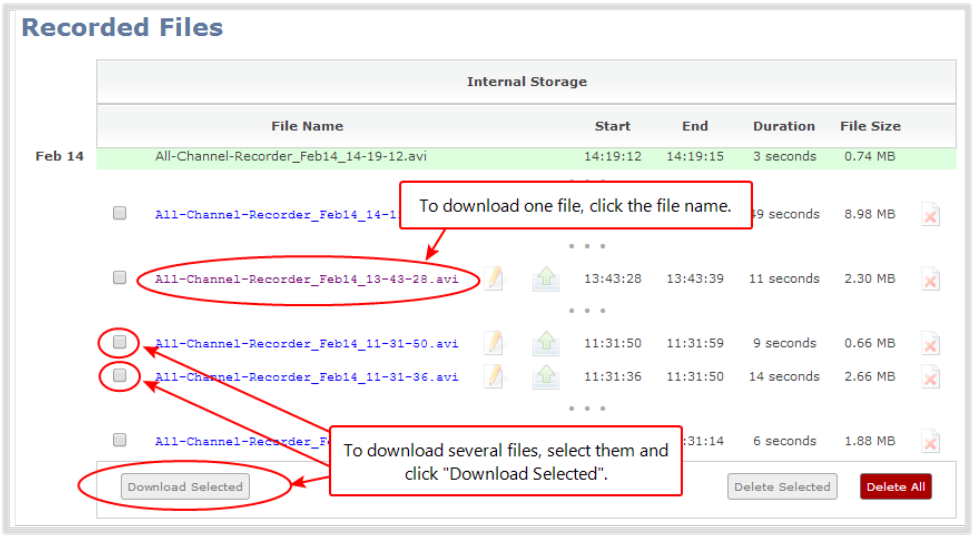
Download Files Manually

Recordings can be manually downloaded from the web interface. You should consider deleting them from internal storage after you complete the download. See Delete Files Manually.

This procedure explains how to download files to your admin computer. See File and Recording Transfer for information on transferring files to a USB drive connected to the device.

To download recordings to your admin computer:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. Find the recordings by channel or by recorder. See View the List of Stored Files.



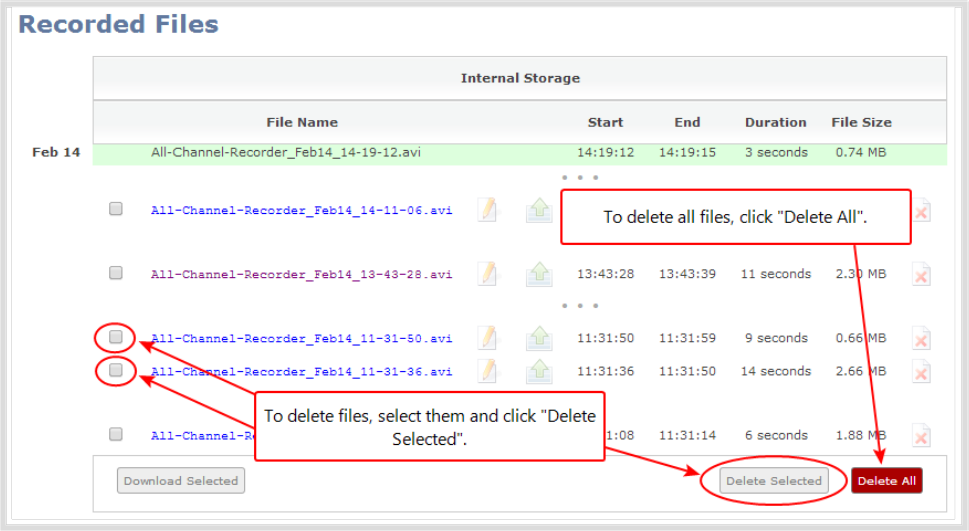
4. To download an individual file:
    a. Click the name of a recording file to download it.
5. To download multiple files:
    a. Select the check box next to the recordings you wish to download from this channel or recorder.
    b. Click **Download Selected** to download a zip file containing the selected recordings.

Delete Files Manually

Recordings can be manually deleted via the web interface. You can delete one file at a time, select multiple files for a given recorder or channel and delete those, or you can delete all recordings for a channel or recorder.

To delete recordings:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. Find the recordings by channel or by recorder. See View the List of Stored Files.



4. To delete an individual file:
    a. Click the X icon to the right of a file entry to request deletion; a confirmation dialog appears.
    b. Click OK on the confirmation dialog.
5. To delete multiple files:
    a. Select the check box next to the recordings you wish to delete.
    b. Click **Delete Selected**; a confirmation dialog appears.
    c. Click **OK** on the confirmation dialog.

The list may not update immediately. You can refresh the list by reloading the Files Archive page.

6. To delete all files:
    a. Click **Delete All**; a confirmation dialog appears.
    b. Click **OK** on the confirmation dialog.

The list may not update immediately. You can refresh the list by reloading the Files Archive page.

5-3 File and Recording Transfer

Your Lecture Recorder x2 can be configured to automatically upload recordings from local storage to a network storage location or an attached USB drive.

This section discusses the following generic automatic upload topic:

- Configure Automatic File Upload (Part 1 of 2)

And the following specific configurations based on the location of upload:

- Configure Automatic File Upload to an FTP Server (Part 2 of 2)
- Configure Automatic File Upload using RSync (Part 2 of 2)
- Configure Automatic File Upload using CIFS (Part 2 of 2)
- Upload to an External USB Drive
    - As a one-time copy
    - Manually

Configure Automatic File Upload (Part 1 of 2)

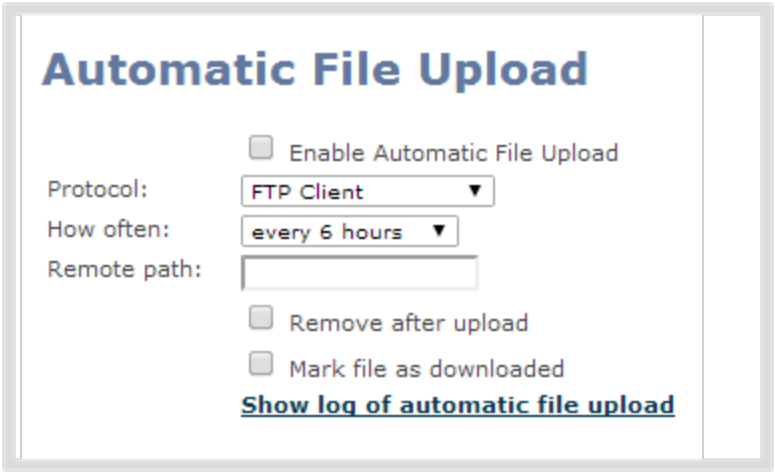
The Lecture Recorder x2 can automatically upload files to an accessible off-device storage location. Four types of off-device storage are supported (FTP, CIFS, RSync); only one can be used at once.

Files are uploaded once (i.e. are automatically not re-uploaded during future sessions) and a log is kept showing the file transfers. The first transfer occurs after the configured amount of time expires, or after the current file completes recording.

Files saved before you complete automatic file upload configuration are not part of the automatic upload. Manual file transfer is required for these files. See File Maintenance.

To configure automatic uploads:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select **Automatic File Upload** from the Configuration section; the Automatic File Upload configuration page opens.



4. Select the **Enable Automatic File Upload** checkbox.
5. Specify how often automatic updates should happen.

   The first transfer occurs after the specified amount of time expires, or after the current file completes recording. I.e. if the value is set to every hour and five videos are saved the first hour, those five videos are uploaded after the first hour, and one hour later the videos saved in the second hour are uploaded.

   The following table describes the available options.

   Table 20 *Automatic File Upload Interval Options*

Name	Description
On file rotation	The device uploads each file after it stops recording it. You can control file size and length to determine when files are done recording. You can also use the reset button to close the current file and open a new one. See Create Recordings.
Every hour	The device uploads completed recordings every hour.
Every 6 hours	The device uploads completed recordings every six hours.
Every 12 hours	The device uploads completed recordings every 12 hours.
Every 24 hours	The device uploads completed recordings every 24 hours.

6. Indicate the remote path, if desired. If no path is specified, the files are copied to the root folder of the destination file system.

If the remote path does not exist on the remote server or USB drive, the file transfer fails.

7. If desired, check **Remove after upload** to have the files deleted from local storage when upload completes.
8. If desired, check **Mark file as downloaded** to have the color of the file link in the file archive list change to show the files are downloaded. This only applies if the files are not deleted after upload is complete.
9. Select the protocol or destination for upload. The following table describes the options.

Table 21 *Automatic File Upload Interval Options*

Name	Description
FTP Client	The device uploads to an FTP server.
RSync Client	The device uploads to a network location using RSync to copy the file.
CIFS Client	The device uploads to a network location using CIFS (also known as SMB or samba) such as a shared folder on a Windows machine.

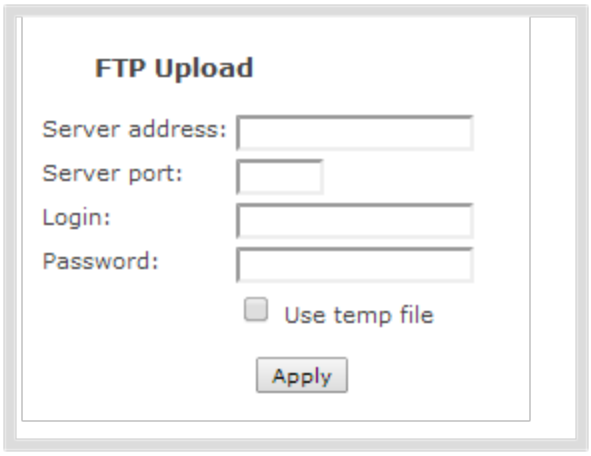
10. Follow the procedure below for configuring your selected protocol.

Configure Automatic File Upload to an FTP Server (Part 2 of 2)

This procedure assumes you have completed the steps in Configure Automatic File Upload (Part 1 of 2) and wish to continue with configuration of upload to an FTP Server.

To configure upload to an FTP server:

1. Select **FTP Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your device is configured with DHCP or has a valid DNS configuration (see Configure Network Settings), you can use the server's fully qualified domain name

instead of the IP address.

3. Specify the **Server Port** used for the target FTP server. The standard port is 21.
4. Enter the FTP account username in the **Login** field.
5. Enter the FTP account password in the **Password** field; the characters are masked with dots.
6. Select Use temp file to name files with a temporary filename extension (.part) on the server until upload is complete.
7. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to an FTP server.

Table 22 *FTP Automatic Upload Configuration Options*

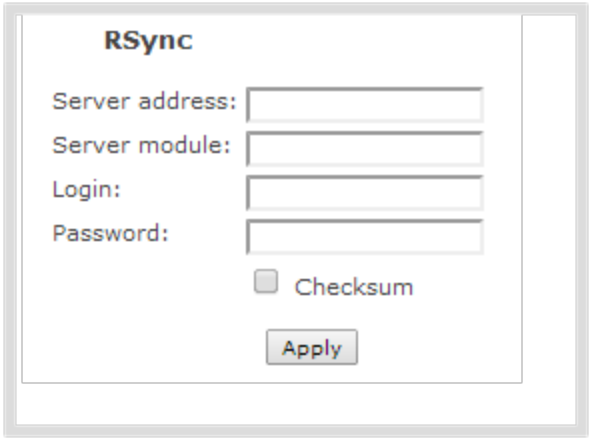
Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the FTP server.
Server port	The port used by the target FTP server. Standard port is 21.
Login	Username for the FTP server.
Password	Password for the FTP user.
Use temp file	Causes files to be named with .part extension on the server during active upload. When the upload completes, the file is renamed to the appropriate extension (.mov or .avi).

Configure Automatic File Upload using RSync (Part 2 of 2)

This procedure assumes you have completed the steps in Configure Automatic File Upload (Part 1 of 2) and wish to continue with configuration of upload using RSync.

To configure upload using RSync:

1. Select **RSync Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your device is configured with DHCP or has a valid DNS configuration (see Configure Network Settings), you can use the server's fully qualified domain name instead of the IP address.
3. Specify the **Server module**. This is the name of the shared folder on the server. If needed, request this value from your network administrator.
4. Specify a username for the RSync Server in the **Login** field. The user must have write permissions for the module.
5. Specify the password for the user in the **Password** field; the value is masked by dots.
6. If desired, select the **Checksum** check box to add a checksum validation to the transfer between the device and the recipient server.
7. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to an RSync server.

Table 23 *RSync Automatic File Upload Configuration Options*

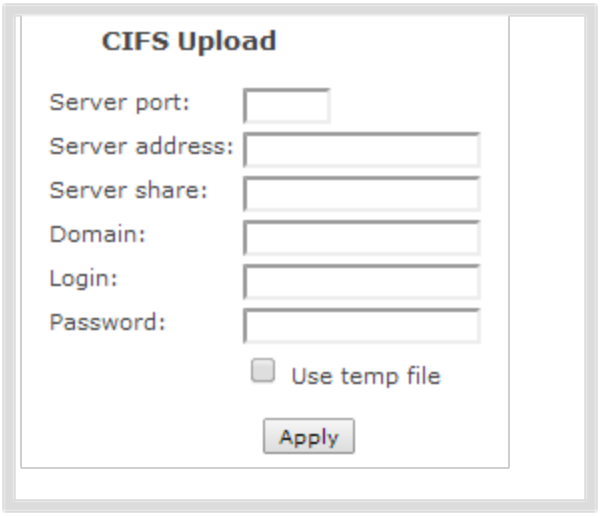
Name	Description / Options
Server address	The IP address (or fully qualified domain name) of the RSync server.
Server module	The name of the shared folder on the RSync server.
Login	Username for the RSync server.
Password	Password for the RSync user.
Checksum	Select to enable checksum checking during file transfer. This increases the time taken to transfer, but also increases reliability of the transfer.

Configure Automatic File Upload using CIFS (Part 2 of 2)

This procedure assumes you have completed the steps in Configure Automatic File Upload (Part 1 of 2) and wish to continue with configuration of upload using CIFS (also known as SMB or samba).

To configure upload using CIFS:

1. Select **CIFS Client** from the protocol drop down list in the Automatic File Upload configuration page; the lower half of the page reflects the selection.



2. Specify the target **Server address**. If your device is configured with DHCP or has a valid DNS configuration (see Configure Network Settings), you can use the server's fully qualified domain name instead of the IP address.
3. Enter the target **Server port**, if you have configured the server to use something non-standard. Leave this value blank to use the default port.
4. Specify the **Server share**. This is the CIFS share name or the name of the shared folder on the server. If needed, request this value from the network administrator.
5. If the device is in a different domain than the server or if it is part of Active Directory, enter the **Domain name** of the CIFS server.
6. Specify a username for the CIFS Server in the **Login** field. The user must have write permissions for the share folder.
7. Specify the password for the user in the **Password** field; the value is masked by dots.
8. Select Use temp file file to name files with a temporary filename extension (.part) on the server until upload is complete.
9. Click **Apply**; if there are any problems the system notifies you with a message: One or more parameter values are not valid and those were not applied!

The following table describes the options applicable to configuring upload to a CIFS server.

Table 24 *CIFS Automatic File Upload Configuration Options*

Name	Description / Options
Server Port	The CIFS server port. Leave blank to use the default port, or enter the port used for your CIFS server.
Server address	The IP address (or fully qualified domain name) of the CIFS server.
Server share	The name of the shared folder on the CIFS server.
Domain	The CIFS server's Windows domain or Work Group name . Needed if the server is part of Active Directory or a Domain Controller.
Login	Username for the CIFS server.
Password	Password for the CIFS user.
Use temp file	Causes files to be named with .part extension on the server during active upload. When the upload completes, the file is renamed to the appropriate extension (.mov or .avi).

Upload to an External USB Drive

The device is equipped with USB ports that can be used to copy files from internal storage to external USB flash drives or hard drives. An example use of this feature is to provide speakers with a copy of their presentation before they leave the presentation venue.

The external drive must be formatted with one of the following file systems:

- FAT16
- FAT32
- XFS
- EXT2
- EXT3
- EXT4

File transfer to a USB drive occurs in one of the following ways. This section describes the procedures.

- One-Time Copy/Move of All Recorded Files to USB Drive
- Manually Copy Recorded Files to USB Drive
- View Available USB Storage Space
- Safely Eject the USB Drive

Only one copy or move to USB operation is permitted at a time, even though the UI may appear to let you start a second one. Please wait until the first is complete before starting a new operation.

One-Time Copy/Move of All Recorded Files to USB Drive

When configured to make a one-time copy of files, the device will automatically begin to copy files to an inserted USB drive, starting with the newest recording. Files will continue to copy until all are copied, the specified maximum number of files is copied, or the target drive runs out of storage space.

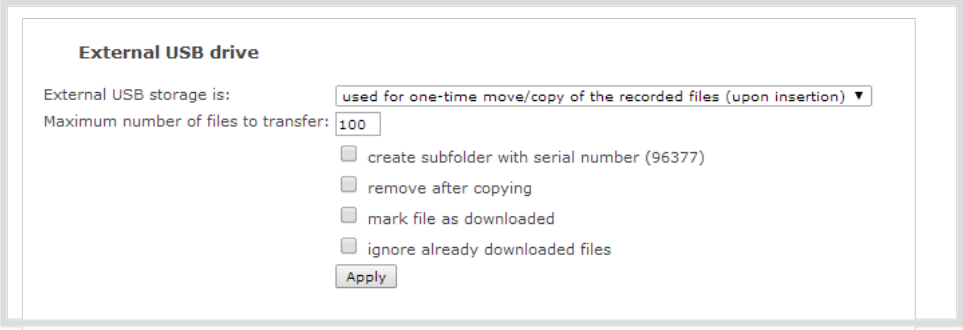
The file currently being recorded (if any) cannot be transferred until recording is completed.

This procedure is separate from automatic file upload and does not need any pre-configuration in the automatic file upload page.

Ideally only USB drives with visible activity indicators should be used. If your USB drive has no activity indicator, you can check the greed LED on your Lecture Recorder x2. It blinks during copy/move operations.

To configure a one-time copy of all recorded files to a USB drive:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **External USB Drive** link in the Configuration section; the External USB Drive configuration page is displayed.
4. Select **used for one-time move/copy of the recorded files (upon insertion)** from the drop down list.



5. Select the appropriate check boxes based on the descriptions provided in the following table. If your USB drive does not have activity indicators it is suggested you select either remove after copying or mark file as downloaded.

Table 25 One-Time Transfer/Copy to External USB Drive Options

Name	Description
create subfolder with serial number (<serial>)	If checked, the transfer process creates a sub-folder with the device's serial number on the USB drive. This is useful if you are using the same drive to collect recordings from multiple devices and want to know which device they came from.
remove after copying	If checked, the file(s) are removed after being copied to the USB drive. Checking this box makes the transfer a move instead of a copy.
mark file as downloaded	If checked, the files that are downloaded are marked with a downloaded icon when viewing file lists. This has no effect if remove after copying is checked.
ignore already downloaded files	If checked, files that were previously marked as downloaded are not included in subsequent downloads.

6. Click **Apply**; the changes are saved.

If a conflict is reported regarding the Automatic file upload, go to the Automatic File Upload configuration page and disable automatic file upload or switch it to a non-USB based upload type. Repeat the steps above.

7. Insert the properly formatted USB drive into one of the device's USB ports; the drive is recognized and the transfer begins. If the drive has an activity indicator light, it flashes during the transfer.Additionally, the Lecture Recorder x2's green LED blinks to indicate copy/move operations.
8. When the activity light stops flashing, remove the USB drive.
9. If your USB drive does not have activity indicators:
    a. Check the **Files Archive** for each channel and the **Recorded Files** list for each recorder to verify if there are files that have yet to be copied.
    b. Safely Eject the USB Drive when you are satisfied all files have been copied, or if you see the USB drive is out of storage space (View Available USB Storage Space).

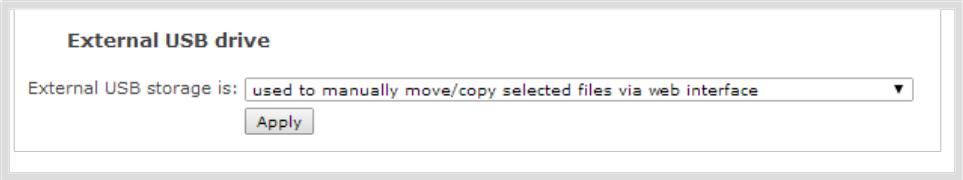
Manually Copy Recorded Files to USB Drive

You can manually copy recorder files to a USB drive connected to the Lecture Recorder x2.

This procedure is separate from automatic file upload and does not need any pre-configuration in the automatic file upload page.

To manually copy recorded files to a USB drive:

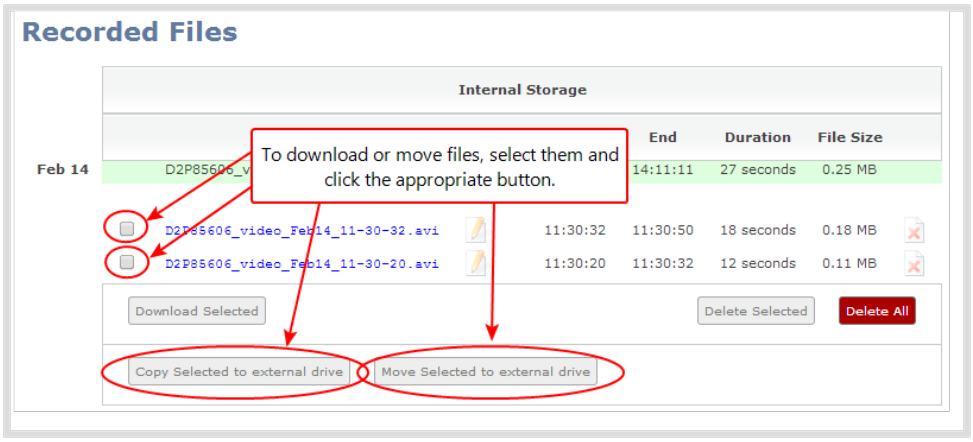
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **External USB Drive link** in the Configuration section; the External USB Drive configuration page is displayed.
4. Select **used to manually move/copy selected files via web interface** from the drop down list.



5. Click **Apply**; the changes are saved.

If a conflict is reported regarding the Automatic file upload, go to the Automatic File Upload configuration page and disable automatic file upload or switch it to a non-USB based upload type. Repeat the steps above.

6. Click the **Recorded Files** button from the menu; the recorded files list opens.
7. Select the check box next to the files you wish to download. In the example below the topmost file is still recording and cannot be downloaded.



8. To copy the files to the USB drive:
    a. Click **Copy Selected to external drive**
9. To move the files to the USB drive (i.e. erase the files after the copy)
    a. Click **Move Selected to external drive**

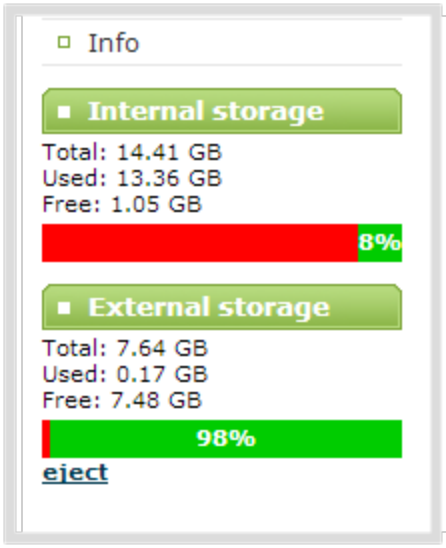
10. Repeat the steps to select a channel or recorder and copy or move files to the external drive until you have copied all the files you wish. The green LED blinks to indicate copy/move operations.
11. Follow the steps to Safely Eject the USB Drive.

View Available USB Storage Space

When you insert a USB drive in an available port of the Lecture Recorder x2, the total and free space are calculated and displayed in the Web Interface.

To see the available USB storage space:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Insert your USB drive in an available USB port on the device. (It is recommended you only use one USB drive at a time.)
4. Scroll to the bottom of the Web Interface page; external USB storage is displayed under internal storage space.



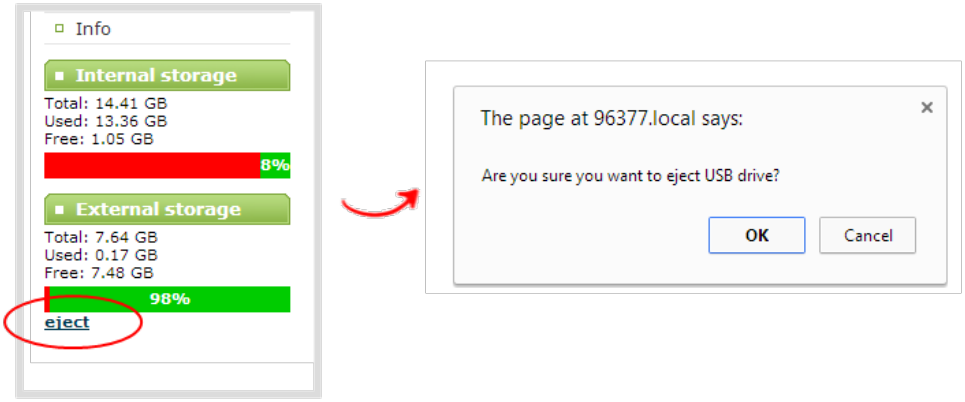
Safely Eject the USB Drive

When you have completed work with the USB drive you can safely eject it by using the link at the bottom of the Web Interface page.

To safely eject the USB drive:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.

2. Login as admin.
3. Scroll to the bottom of the Web Interface page; click the eject link below external storage space.



4. When prompted, click OK to confirm that you want to eject the USB drive.
5. Disconnect the USB drive from the device.

5-4 Use the Local FTP Server

Your Lecture Recorder x2 can act as an FTP server, allowing you to manually or automatically connect to the system and download recordings. Depending on configuration of the FTP server, you may also be able to remotely delete files after download, maximizing available device storage.

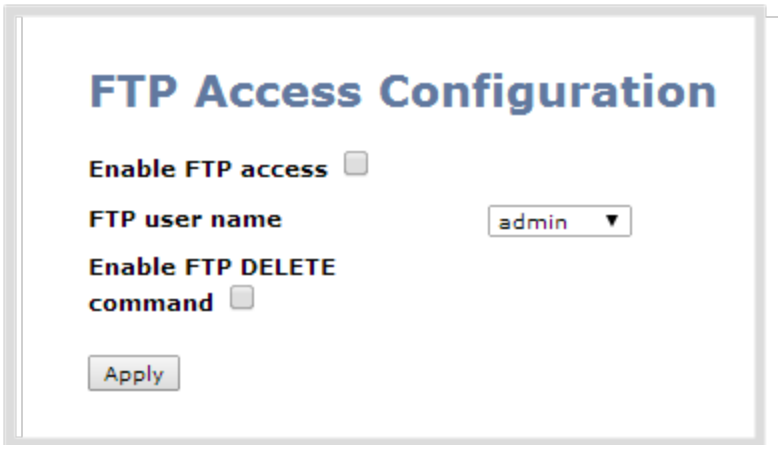
This section discusses the following FTP Server topics.

- Configure the Local FTP Server
- Downloading Files from the Local FTP Server

Configure the Local FTP Server

To configure the FTP server:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **FTP Server** link in the Configuration menu; the FTP Server configuration page opens.



4. To enable the FTP server:
   a. Select the **Enable FTP access** check box.
   b. Select a user from the **FTP user name** drop down.

> The ftp password is the regular access password for the selected user. See User Administration for details on user names and passwords.

c. Click **Apply**.

5. To allow the FTP user to delete files:
   a. Select the **Enable FTP DELETE command** check box.
   b. Click **Apply**.

   Any currently logged in ftp users must log out and back in again to have access to the command.

6. To disable the FTP server:
   a. De-select the **Enable FTP access** check box.
   b. Click **Apply**.
7. To disable file deletion by FTP:
   a. De-select the **Enable FTP DELETE command** check box.
   b. Click **Apply**.

   Any currently logged in users will continue to have access to the delete command until they log out and log in again.

The following table summarizes the options for configuring the local FTP server.

Table 26 *FTP Server Configuration Options*

Name	Description / Options
Enable FTP access	The check box controls whether or not the device acts as an FTP server. By default this is disabled.
FTP user name	Select one of the device users: admin, operator, or viewer. The ftp password will be the access password for the selected user. By default the admin user is selected.
Enable FTP DELETE command	Controls whether or not FTP users can delete files. By default file deletion is not permitted.

Downloading Files from the Local FTP Server

Once you have configured a local FTP server, you can use the tool of your choice to download files from the device.

To get started you will need:

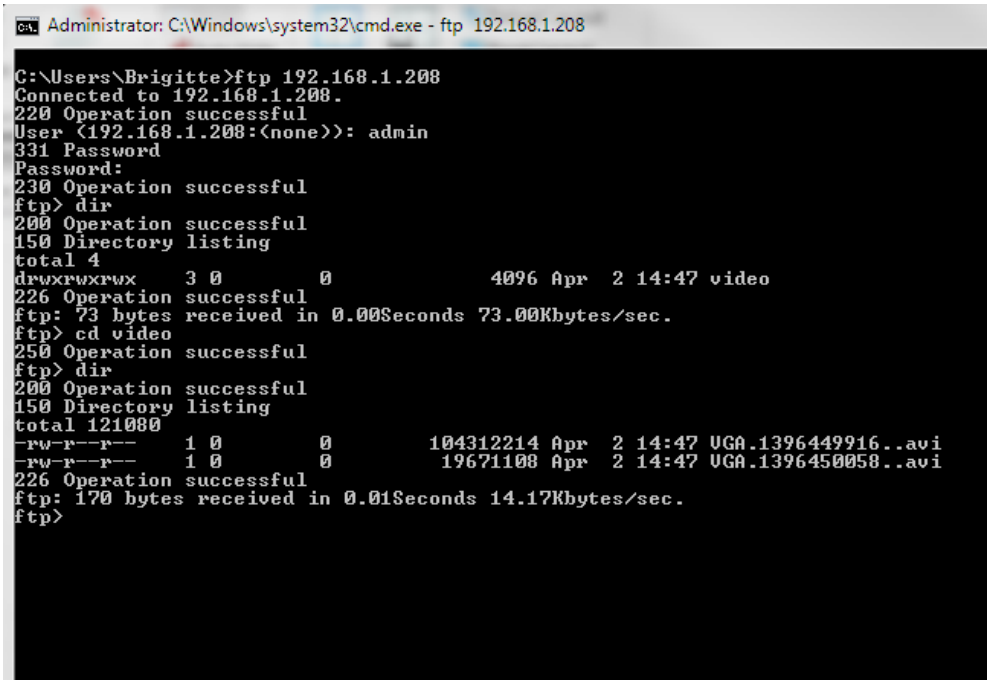
- The IP address of your device (found in the **Network** configuration menu)
- An FTP tool
- The username and password for your FTP user (See Configure the Local FTP Server)

In the example below, the IP address of the Lecture Recorder x2 is 192.168.1.210, the username is admin, there is no password, and the Windows command line ftp utility is used.

To connect to the FTP server:

1. Open a command window on Windows (alternatively open a terminal window on Linux/Mac, or open your FTP utility of choice).
2. Establish an ftp connection using the command: ftp 192.168.1.210
3. Provide the username: admin (provide the username of your FTP user)
4. Provide the password: (provide the correct password for your FTP user); the connection is opened.
5. Use the dir command to see the file structure, the recordings are in the video folder.

Figure 4-1 *Login to the FTP Server*



6. Use get or your tool's transfer mechanism to transfer files to your computer.

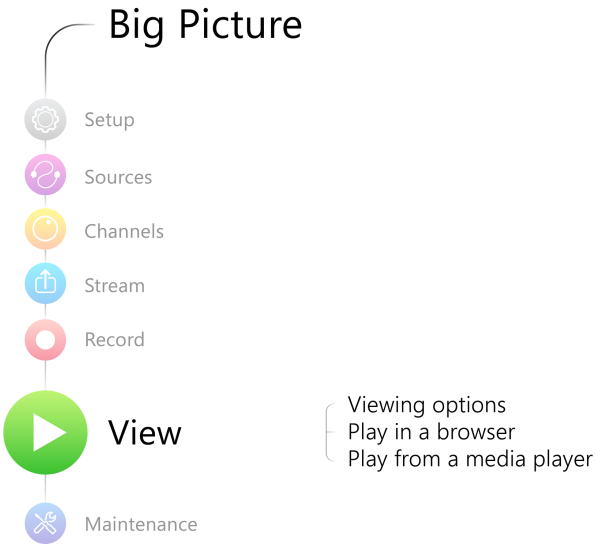
Figure 4-2 *Download a file via FTP*

7. If enabled in the FTP configuration page, delete the file after downloading it by issuing the delete command, or using your tool's delete mechanism.

If the delete command is not enabled, attempting to delete a file will result in an Unknown Command error.

PART 6: View

Now that you have perfected your stream, identified the medium to publish your stream, it's time to view the video stream from a media player or a web browser.



This section discusses the following topic related to viewing your content:

- View your video

6-1 View your video

This chapter describes factors to consider when choosing a streaming URL and steps to view the video stream from a media player or a web browser. Refer to the following sections:

- View the live broadcast and retrieve stream URLs
- Viewing with a web browser
- Viewing with a media player
- Viewing with UPnP
- Viewing with Session Announcement Protocol (SAP)

View the live broadcast and retrieve stream URLs

There are two methods to view the current broadcast and to retrieve the stream URLs:

- Live View button on the main menu; or
- Live broadcast link on the web admin Info window.

View your broadcast using the Live View button on the main menu

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. From the web interface, scroll to the Live View menu option. A window opens displaying the live broadcast and stream URL.

4. Copy the URL and provide to viewers. Based on their media player, viewers can access the broadcast using a URL specific to their media player.

View your broadcast using the Live View button on the Info menu

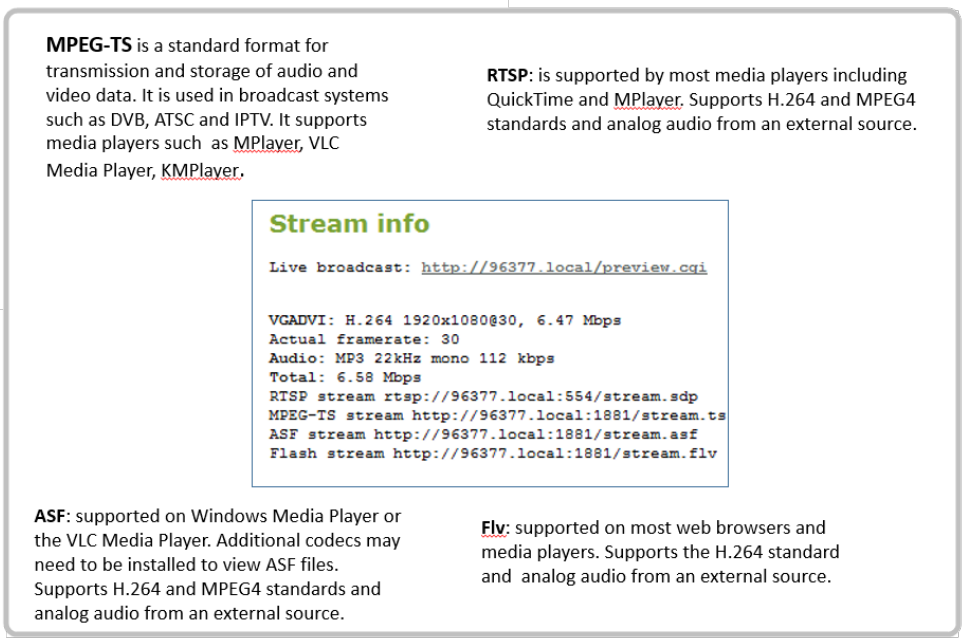
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. From the web interface, click **Info**; the info page opens displaying the live broadcast and stream URL.
3. Click on the Live broadcast link; a window opens displaying the live broadcast and stream URL.

4. Copy the URL and provide to viewers. Based on their media player, viewers can access the broadcast using a URL specific to their media player.

Sending stream URLs to viewers

For participants to log in and view a stream, you must provide a stream URL. The URL that you send depends on the device the participant uses to view the stream. You can provide separate URLs for the stream coming from each channel, or one URL that includes streams from both channels.

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.



When the single channel stream mode is enabled, this URL is used to view video from both DVI and S-Video inputs.

3. Copy the URL and provide to viewers. Based on their media player, viewers can access the broadcast using a URL specific to their media player.

Viewing with a web browser

If a viewer password is configured, provide participants with the password to log in, along with the IP address or the URL to be used by the participant's browser.

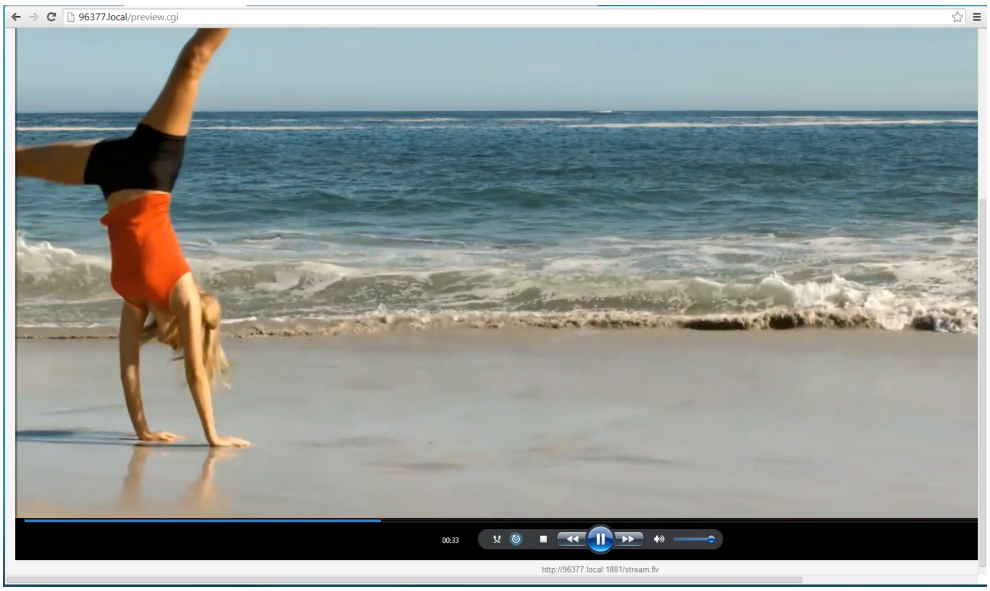
1. Open a web browser.
2. Enter the IP address of the broadcast stream, refer to the example below. To locate the IP address for the broadcast, refer to View your video

> If the IP address of the broadcast is 172.20.1.33, then browse to: http:// 172.20.1.33

3. Enter the user name and password at the prompt:

> User Name: viewer
> Password: (enter the viewer password)

4. Press Enter. The stream is played in the browser window.

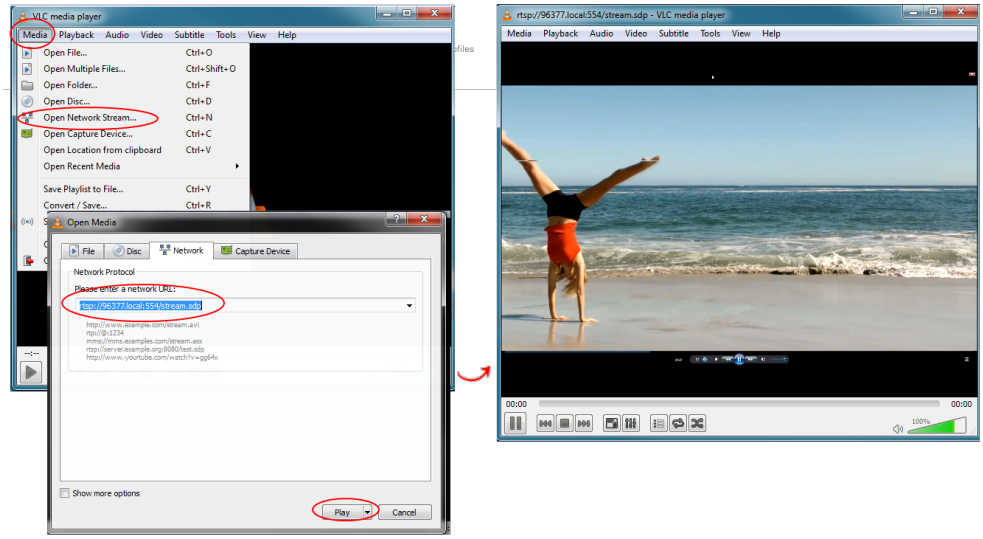


Viewing with a media player

If a viewer password is configured, provide participants with the password to log in, along with the IP address or the URL to be copied to the media player. For example purposes the following procedure describes the steps using a VLC media player.

1. Launch a media player.
2. Click the **Media** tab, a drop-down menu opens.
3. Choose Open Network Stream; a dialog box opens.
4. Enter the stream URL .

rtsp://96377.local:554/stream.sdp



5. Press Play. The stream is played in the media player window.

Viewing with UPnP

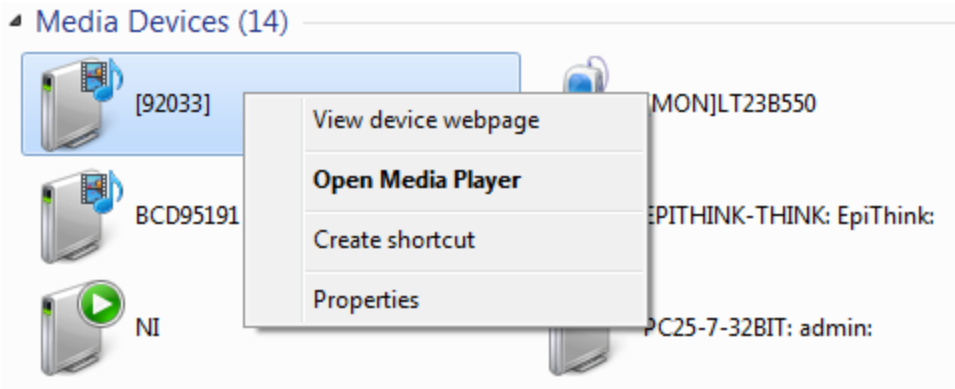
Using a software or hardware media player, you can browse for files or streams with Universal Plug and Play (UPnP). UPnP uses MPEG-TS over HTTP with the H.264 codec and MP3 or AAC audio encoding (or no audio). You can only access live streams or recordings that meet these requirements.

For security reasons the default behavior prevents UPnP access to live streams and recorded files. To enable UPnP, see **Stream content using UPnP**

Some players cannot access the stream or saved recordings if a viewer password is set. If needed, see **Removing User Passwords** to clear the viewer password.

When browsing via UPnP your Lecture Recorder x2 is displayed by the server name you set, or it's product serial number.

For example, when browsing from a Windows computer, you will see a list of media devices that includes the Lecture Recorder x2:



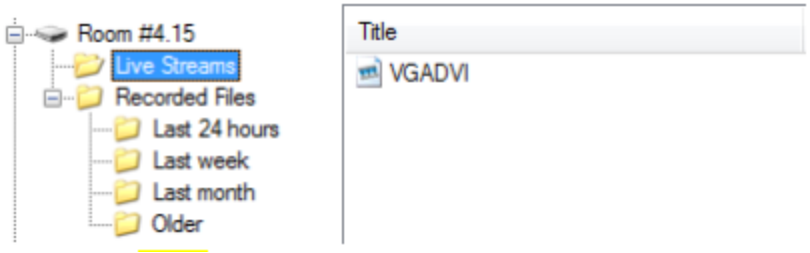
Live Streams

When you open the device from Windows Media Player, you'll see a list of the available channels you can stream under the Videos tab. The channel name is VGADVI. From other digital media players, the channel list can be under a **Live Streams** folder.

With Windows Media Player, double click to open any channel and press Play to start the stream. Using your digital media player, select a live stream and press play.

Recorded Files

Recorded files are shown in the Recorded Files folder. Files are organized by the channel or recorder from which they were recorded. Windows Media Player shows the recorder files side by side with the channels and other digital media players show the recorded files in a file tree format, see below.



UPnP can also be used to directly play a recording to the digital media player, or to set a media player to automatically play a particular live stream after reboot of the Lecture Recorder x2. See Stream content using UPnP and Auto-restart playback to a UPnP Device.

Viewing with Session Announcement Protocol (SAP)

When SAP Announce is configured for a stream that uses UDP streaming, the stream is advertised over the local network. Local viewers can view the stream using a software or hardware media player. Viewers are presented with a list of available channels, similar to a television menu. Viewers need only click on a stream and

the video is streamed to their desktop, mobile or tablet. To configure SAP announce, go to Stream content using multicast streaming.

Your Lecture Recorder x2 is advertised by the metadata title, if one was configured under Stream Branding, otherwise it is identified by it's product serial number. For a description of how to set the metadata, refer to Add your logo and company information to your channel.

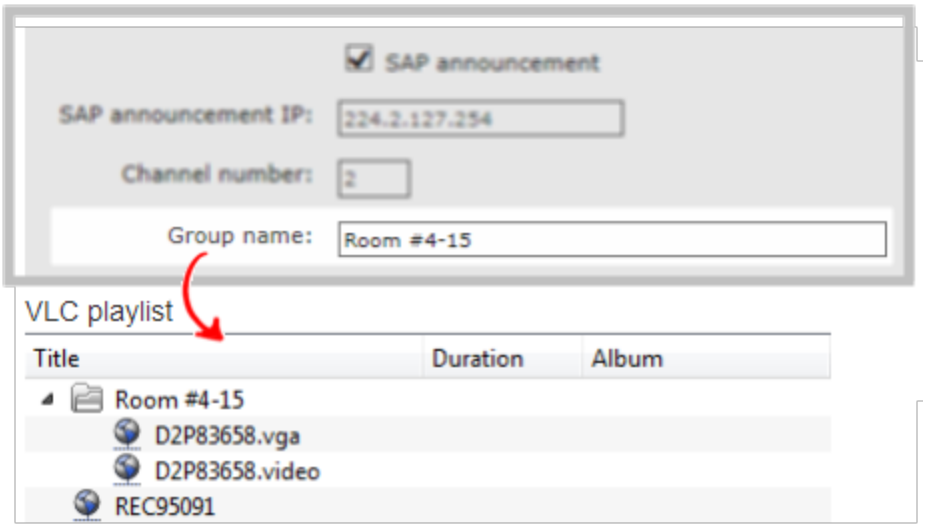
When browsing from a VLC media player, streams are advertised by their product serial number and are organized by the group name. When browsing from an XBMC media player, streams are advertised by the stream's metadata title, if configured, otherwise streams are advertised by their product serial number.

1. Ensure the stream has SAP announcement enabled, otherwise it is not advertised in the media player's playlist.
2. Ensure the SAP announcement IP is a multicast IP address.

   Some media players, for example Exterity receivers, listen for SAP announcements on a specific multicast address 239.255.255.255. If your audience is using Exterity to view your stream, you must change the SAP announcement IP address to 239.255.255.255.

4. Launch a media player. The following steps are based on a VLC media player and may be different for other media players.
5. Click View from the menu; a drop-down menu opens.
6. Select Playlist. A Playlist window opens. The right-hand panel indicates the playlist is empty.
7. From the side menu, click Network streams (SAP). The playlist is populated with all streams in your network that are SAP announcement enabled. If you specified a Group Name when you configured the publish stream the stream will be listed in folder identified by the group name.

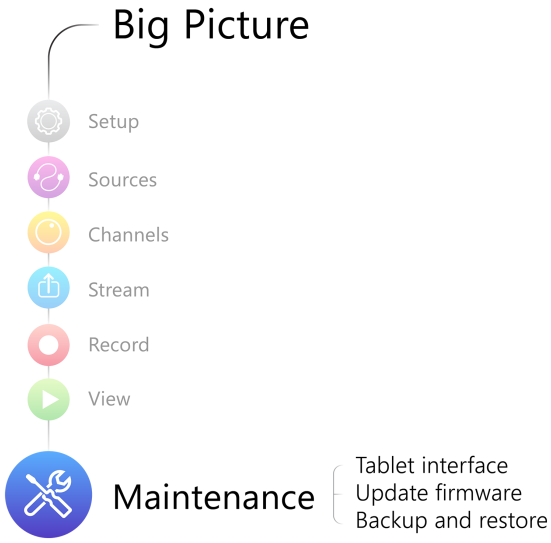
In the example below, two streams D2P83658.vga and D2P83658 are organized in a folder by their group name.



8. Click on a live stream; the stream plays in the media player window.

PART 7: Maintenance

This section covers topics that will keep your Lecture Recorder x2 running smoothly. It also covers a new tablet operator interface and ways to configure and operate your device using third party tools via HTTP or RS-232.



Specific topics covered are:

- Mobile / Tablet Operator Interface
- Power Down and System Restart
- Save and Restore Device Configuration
- Restoring Factory Configuration
- Firmware Upgrade
- Remote Support
- Storage Disk Maintenance
- Control with RS-232 / Serial Port
- Control with HTTP Commands
- Configuration Keys for Third Party APIs

7-0 Mobile / Tablet Operator Interface

Epiphan's tablet interface is designed for touch-screen devices. Use your tablet or mobile device to perform confidence checks and basic operator tasks such as verifying disk space or starting and stopping recording.

This section describes procedures for the following topics:

- Connect to the tablet interface
- Confidence monitoring using the tablet interface
- Verify disk space via the tablet interface
- Control recording via the tablet interface
- Switch to the full admin interface

Connect to the tablet interface

To get started with the tablet interface you can connect to it in one of the following ways.

The device connecting to the tablet interface must be on the same network as the Lecture Recorder x2 or must be physically connected to it via USB.

- Use the browser over Ethernet
- Use tethering on your device
- Use the mobile version of Epiphan Connect

Use the browser over Ethernet

You can connect to the tablet interface with a browser on your admin computer, tablet, or touch-screen device.

To connect to the tablet interface:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. Connect to the Admin Interface

```
http://<ip address of device/admin/m
 or
http://<serial number of device>.local/admin/m
```

For example: http://192.168. 1.163/admin/m *or* http://95dd40d5.local/admin/m

In the future you can go directly to the IP address above and login from the mobile interface without ever seeing the usual admin interface.

Use tethering on your device

You can use tethering on your mobile device or tablet to connect to the tablet interface. This option requires some configuration through the full admin interface.

To configure use of tethering (perform this once):

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Network** link in the Configuration menu; the network configuration page opens.
4. Select **No tethering** or any option except **Disabled** from the **Use phone/tablet connection**. See Tether to a Mobile Network for descriptions of the options.
5. Click Apply.

To use you mobile device or tablet via tethering:

1. Turn on tethering on your device. (See device user manual for instructions.)
2. Connect the device to your Lecture Recorder x2 via USB.
3. Use the Epiphan Connect utility to find the device and open the tablet admin interface.

Use the mobile version of Epiphan Connect

Epiphan has iOS and Android versions of the Epiphan Connect discovery utility. The mobile versions of the discovery utility automatically open the tablet interface when connecting to the Lecture Recorder x2 for administration.

See instructions below for installing the application. The iOS version is available from the Apple App Store and the Android version, currently in beta, is available from the Epiphan web site.

To install the application on your iOS or Andriod device (perform this once):

1. Open the App Store (for Apple devices) or Google Play store (for Android devices).
2. Search for **EpiphanConnect** (all one word).
3. Download and install the free Epiphan Connect application.

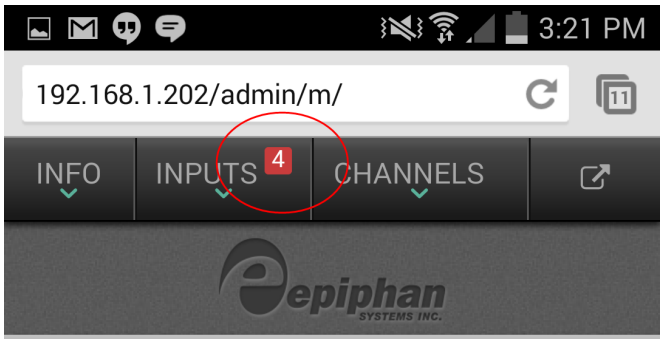
To connect to the device:

1. Once Epiphan Connect is installed, connect to the wifi network where you can access your Lecture Recorder x2.
2. Launch Epiphan Connect; the application searches your network and shows you a list of available Epiphan devices.
3. Find your device in the list. If you have several Epiphan devices, look for the serial number of the one to which you'd like to connect.
4. Select the device by touching the device name; a login prompt is presented.
5. Login as admin or operator; the tablet interface appears.

Confidence monitoring using the tablet interface

When connected to the tablet interface, you can use the **INPUTS** section to monitor the inputs to your device. An auto-updating snapshot of video inputs and an audio level meter is provided.

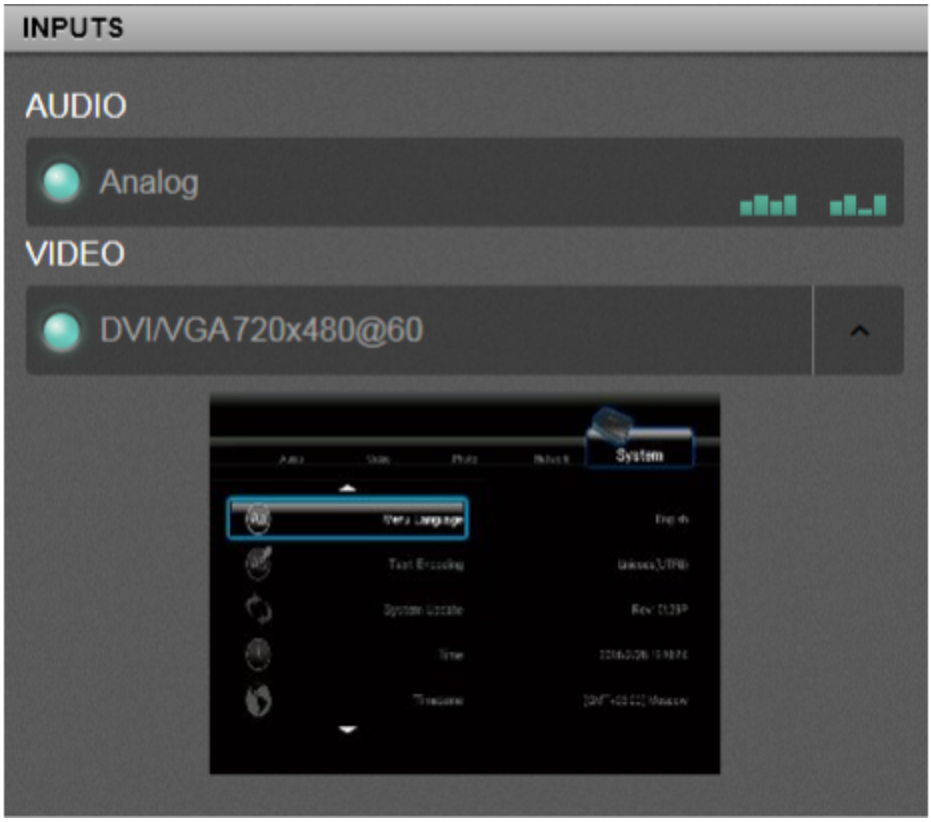
The top of the tablet interface gives you a warning if there are video inputs with no signal. In the example below, 4 video inputs have no signal.



For more detailed information, you can look at each input individually.

To monitor each input:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Scroll to the **INPUTS** section.



4. If there is no audio signal, nothing appears in the audio input bar.
5. If there is an audio signal, the level is shown next to the source name in the audio input bar.
6. If the source has no signal, the name appears red and a note next to the name says NO SIGNAL.

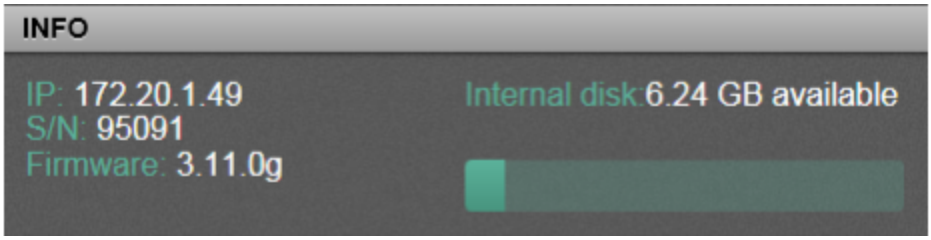
7. If the source has a signal, it is displayed under the source name.

Verify disk space via the tablet interface

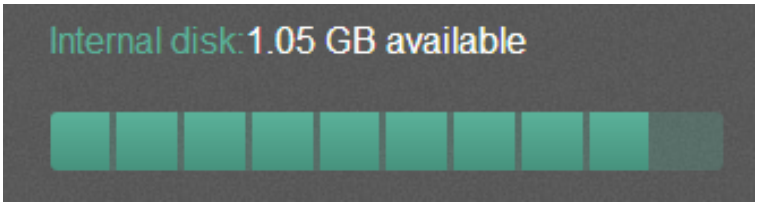
The **INFO** section of the tablet interface lets you know the firmware version, serial number and IP Address of your device. It also shows you the currently available disk space.

To monitor inputs:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Scroll to the **INFO** section; the currently available disk space is shown.



4. If disk space is low, the green bar will be nearly full.

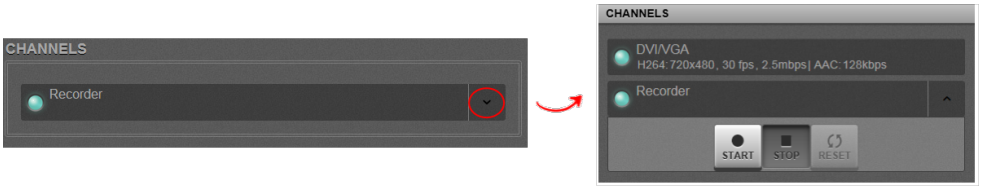


Control recording via the tablet interface

The tablet interface provides a simple way to control recording for your Lecture Recorder x2.

To control recording from the tablet interface:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Scroll to the **CHANNELS** section.

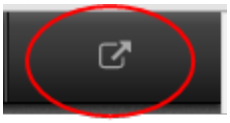


4. Click the down arrow in the row for the recorder.
5. Use the **START**, **STOP**, and **RESET** buttons to control recording.

Switch to the full admin interface

To switch from the tablet interface to the full admin interface:

1. Connect to the tablet interface. See Connect to the tablet interface.
2. Login as admin or operator.
3. Click the arrow button at the top right of the screen. Depending on the width of the screen, the button may say extended view.



EXTENDED VIEW

7-1 Power Down and System Restart

This section covers the following topics:

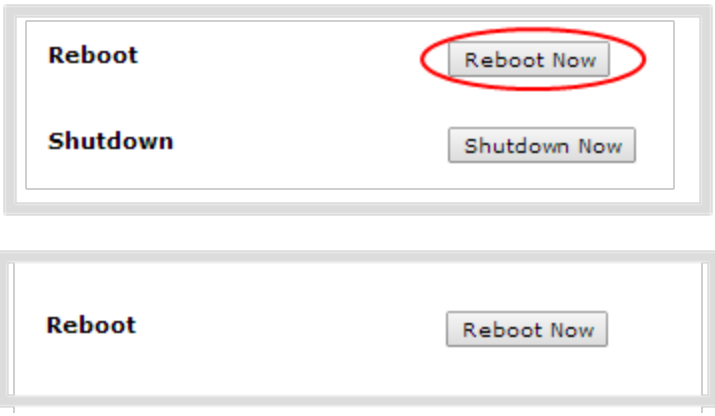
- Restarting the Device via the Web Interface
- Power Down and System Restart

Restarting the Device via the Web Interface

The Lecture Recorder x2 web interface allows you to reboot the device.

To restart the device:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click the **Reboot Now** button; a confirmation dialog appears.

5. Click **OK**.

7-2 Save and Restore Device Configuration

After completing configuration of your Lecture Recorder x2, it is good practice to save the device configuration so you may restore it at a later date (i.e. after a change that wasn't wanted, or after a factory reset) or so you may load it onto another device to provision it with the same configuration.

This section covers the following topics:

- Save device configuration
- Load a saved device configuration

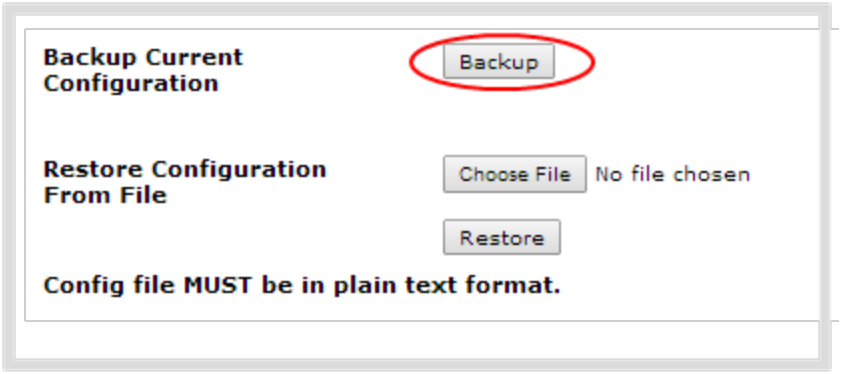
Save device configuration

The Lecture Recorder x2 web interface allows you to save the current device configuration to your admin computer's hard drive. It's good practice to do this before making any major changes to a working configuration and before doing a firmware update.

The resulting backup file includes all non-default configuration settings for the device, except the user passwords which are reset when a configuration is restored.

To save the current device configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connecting to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click the **Backup** button next to Backup Current Configuration; the device performs a backup and depending on your browser the file is either automatically downloaded or you are asked to save the file.



5. Save the file in a secure location.
6. Rename your saved configuration file to indicate the specifics of the configuration, if desired.

Load a saved device configuration

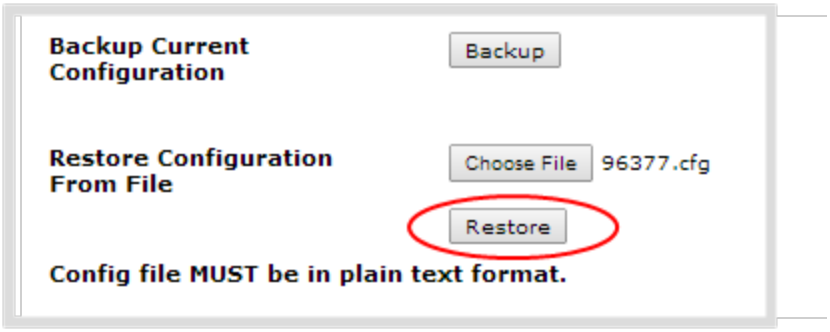
After making changes to the device configuration, you may find that the results are not what you expected or that they serve a different need and you wish to return to a previous configuration. Via the Lecture Recorder x2 web interface you can load a previously saved configuration file.

Configuration files are by default named <serial number>.cfg. You may have more than one configuration file saved from the device. Select the correct configuration file and know where it is accessible from your local computer before starting this procedure.

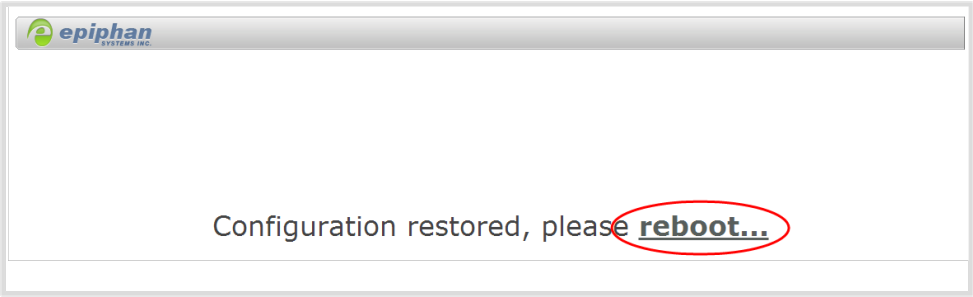
The resulting backup file includes all non-default configuration settings for the device, except the user passwords. All passwords are reset to blank after the configuration is loaded.

To load a saved device configuration:

1. Connect to the admin interface using your preferred connection mechanism. See Connecting to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click the **Choose File** button beside Restore Configuration from File; you are prompted to choose the configuration file.
5. Select the desired configuration file from storage on your local computer and click **Open**.



6. Click the **Restore** button; the system configuration is restored and a new page appears asking you to reboot the device.



7. Reboot the device by clicking the link in the message on the web page, or by using the power button on the device; when the system comes back up the restoration is complete.
8. Login as admin (with no password).
9. Reset your user passwords. See Setting and Changing User Passwords.

7-3 Restoring Factory Configuration

If you've been testing with your Lecture Recorder x2 and are ready to restore back to the factory configuration to start again with a clean slate, you can do this manually or through the web interface.

This section covers the following topics:

- Restore Factory Configuration via the Web Interface
- Restore Factory Configuration Manually

Restore Factory Configuration via the Web Interface

The web interface allows you to restore the factory configuration to return your Lecture Recorder x2 back to the original settings it had when you purchased it.

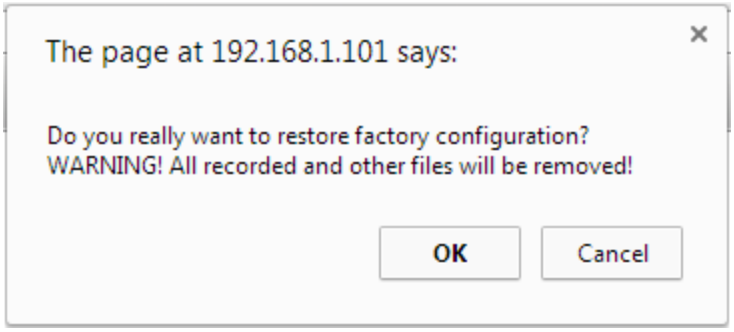
> **STOP** Restoring the factory settings erases everything on the device. This includes all your source settings, channels, network settings, and all saved files.

Only proceed if you know this is what you want to do.

To restore the factory configuration via the web interface:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.

4. Click the **Restore** button next to Restore Factory Configuration; a warning dialog appears asking you to confirm the restoration.



5. Click **OK** on the warning dialog; the device applies the factory configuration and reboots.
6. Wait for the system to reboot and begin re-configuration.

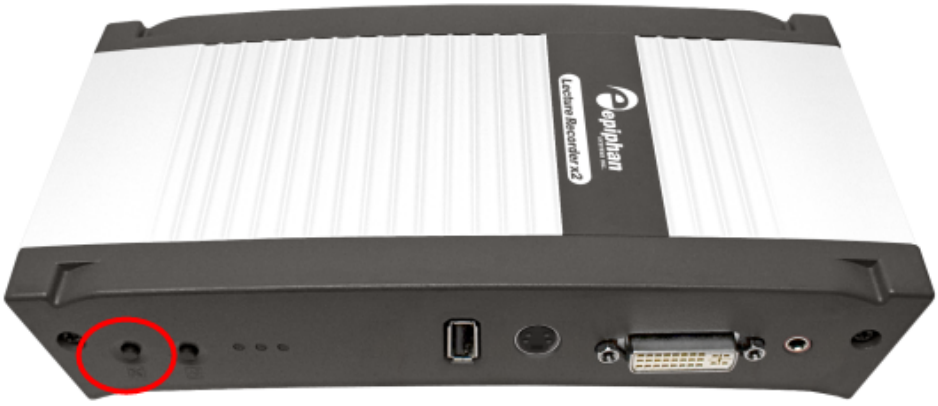
Restore Factory Configuration Manually

If you don't remember the admin password for your Lecture Recorder x2, or you want a manual method to restore factory configuration to the device, you can follow the steps described below.

Restoring the factory settings erases all configuration items on the device. This includes all your source settings, channels, and network settings. Recorded files are not erased.

Only proceed if you know this is what you want to do.

The Lecture Recorder x2 has a factory reset button located on the front of the device. Refer to the image below for the location of the button.



To manually restore the factory configuration:

1. Power down the device, if it is on.
2. Disconnect the power to the device.

3. Press and hold the Factory Reset button on the front of the device while you restore power to the device; the blue LED illuminates.
4. Continue to hold the reset button until the blue light is extinguished and the green LED illuminates.
5. Release the reset button.
6. Wait for the system to reboot and begin re-configuration.

7-4 Firmware Upgrade

Epiphan will from time to time issue an updated firmware revision to bring new features to your Lecture Recorder x2. To take advantage of these new features, you will need to install the new firmware on the device. This section covers:

- Check for Firmware Updates
- Install firmware

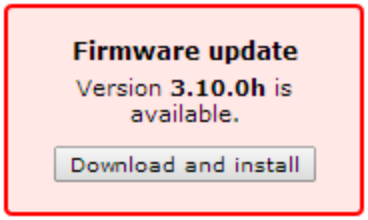
Check for Firmware Updates

When you register your product with Epiphan you are given a choice to be notified of firmware updates for your device. If you selected this choice, you will be notified of updates applicable to the Lecture Recorder x2.

If your Lecture Recorder x2 has internet access, you can check for updates directly by following the procedure below.

To check for new firmware:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
4. Click the check for updates link next to your current firmware version; the system connects to Epiphan servers to look for updates.
5. If an update is found a red box appears in the top left side of the web interface with a link to download and install the firmware.



Install firmware

When you've received a new firmware file from Epiphan's support team, schedule a time where you can update the firmware without negatively impacting viewers or file recordings.

Installing new firmware takes a few minutes. Broadcasting and recording is not available until the upgrade is complete.

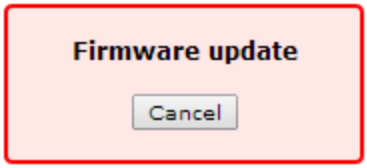
There are two ways to install new firmware: from a the download link via the web interface, or from a file provided by Epiphan.

Install Firmware Directly from the Web Interface:

If your Lecture Recorder x2 has internet access, the easiest method of installing new firmware is to use the download link provided when you check for new firmware.

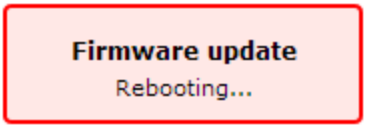
To download new firmware directly:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Save a copy of the current device configuration, if desired. A recent configuration file is needed for the slim case of a power failure or other problem during firmware upgrade . See Save and Restore Device Configuration.
4. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
5. Click the check for updates link next to your current firmware version; the system connect to Epiphan servers to look for updates.
6. Click **download** from the red box that appears at the top left of the admin interface; the firmware is downloaded and immediately starts to install and the firmware update box changes to have a cancel button.



Do not interrupt power to the device during the firmware upgrade. If power is lost due to power failure, restore to the default factory settings before trying again. See Restoring Factory Configuration.

7. When the firmware update is complete, the message lets you know it is going to reboot.



8. Wait for the system to restart. Depending on the upgrade, a disk rebuild may be required, causing the restart process to take much longer than usual.
9. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
10. Login as admin.
11. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
12. Verify that the firmware version is the expected new version.

If the firmware upgrade failed, restore to the default factory settings before trying again. See Restoring Factory Configuration. Once the upgrade is complete, load your saved configuration file.

Install Firmware from a file

Before getting started, ensure you have the firmware file accessible from your admin computer.

To install new firmware from a file:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Save a copy of the current device configuration, if desired. A recent configuration file is needed in the unlikely event of a power failure or other problem during firmware upgrade. See Save and Restore Device Configuration.
4. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
5. Note the current firmware version listed.
6. Click the **Choose File** button next to Select firmware upgrade file; a file selection box opens.
7. Select the firmware upgrade file from your local computer.
8. Click **Apply**; the file is uploaded. The system unpacks and verifies the file. If the file is valid, the upgrade begins.

Do not interrupt power to the device during the firmware upgrade. If power is lost due to power failure, restore to the default factory settings before trying again. See Restoring Factory Configuration

9. Wait for the system to restart.
10. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
11. Login as admin.
12. Select the **Firmware Upgrade** link in the Configuration menu; the firmware upgrade page opens.
13. Verify that the firmware version is the expected new version.

If the firmware upgrade failed, restore to the default factory settings before trying again. See Restoring Factory Configuration. Once the upgrade is complete, load your saved configuration file.

7-5 Remote Support

The Lecture Recorder x2 supports remote troubleshooting by Epiphan's support team. Remote support allows Epiphan to assist in troubleshooting issues you experience with the device and can also assist with resetting lost admin passwords. No private information is sent to the Epiphan maintenance server.

Remote support is on by default.

This section describes procedures for the following topics:

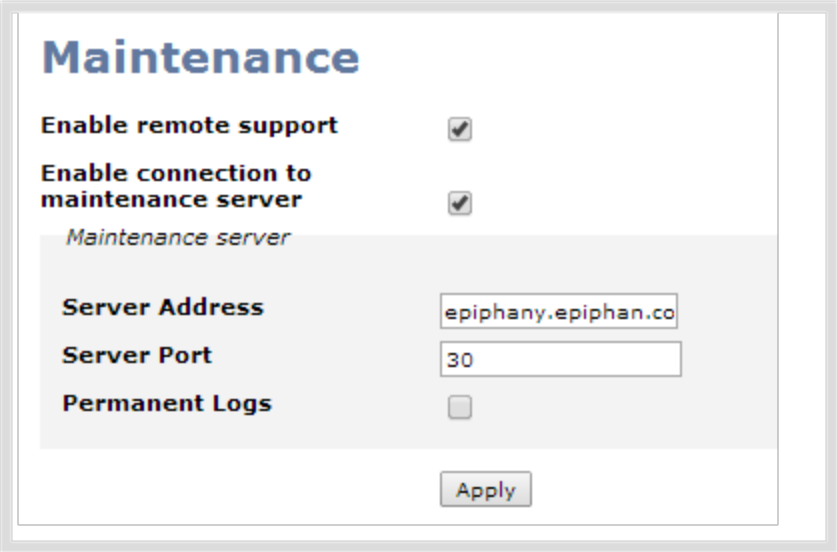
- Configure Remote Support
- Disable Remote Support

Configure Remote Support

Remote support is configured by default to connect to the Epiphan maintenance server with the domain name epiphany.epiphan.com. The device must be able to resolve this domain name to connect to the server and permit remote support. Remote support uses port 30, therefore this port must be available for communication. If your device is protected from the Internet by a firewall, speak to your network administrator to configure the firewall appropriately.

To configure remote support:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.



4. Click **Enable remote support** if the check box is not selected. This setting controls incoming links from Epiphan.
5. Click **Enable connection to maintenance server** if the check box is not selected. This setting configures outgoing links to Epiphan.
6. Ensure the **server address** is epiphany.epiphan.com, unless Epiphan support directs you to change it.
7. Ensure the **port** is 30, unless Epiphan support directs you to change it.
8. Click **Apply**.
9. Test that the device can access the maintenance server:
    a. Select the **Network** link under Configuration.
    b. Type epiphany.epiphan.com **Network Diagnostics** box.
    c. Click **ping**.
    d. Ensure the result shows an IP address for epiphany.epiphan.com and report any packet loss to Epiphan support.
10. If the device cannot reach the maintenance server, check the network settings (see Configure Network Settings) to ensure DHCP is selected or a DNS server is listed and try again. Consult with your network administrator if problems persist.
11. If the device reaches the maintenance server, ensure your firewall, if you have one, has port 30 open for the device.
12. Confirm with Epiphan support that they are able to access your Lecture Recorder x2 for remote troubleshooting.

Disable Remote Support

By default, remote support is on. If you want to turn it off, you may use the following procedure.

Disabling remote support for the Lecture Recorder x2 removes the ability for Epiphan to reset a lost admin password.

To disable remote support:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Maintenance** link in the Configuration menu; the maintenance page opens.
4. Click **Enable remote support** check box to deselect it. This prevents incoming links from Epiphan.
5. Click **Enable connection to maintenance server** to deselect it. This prevents outgoing links to Epiphan.
6. Click **Apply**.

7-6 Storage Disk Maintenance

Your Lecture Recorder x2 is equipped with a solid-state storage drive for storage of recordings. Occasionally, maintenance is required for these disks. This section describes procedures for the following topics:

- Check disk storage space
- Schedule disk check
- Perform disk check

Check disk storage space

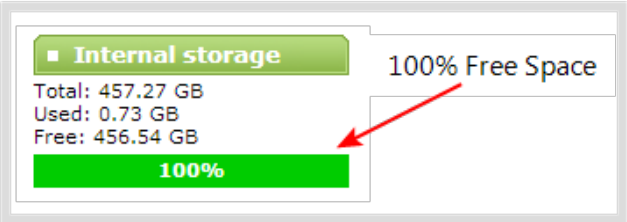
The Lecture Recorder x2 has a finite amount of storage: 16 GB. This storage space holds a lot of recordings, but it can get full. It's a good idea to monitor your current disk usage.

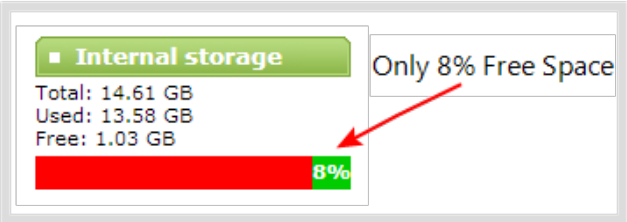
If available storage is low, consider removing some unneeded recordings or setting up an automatic file transfer with deletion after transfer. See File Maintenance and File and Recording Transfer.

Disk space can also be checked via the tablet interface. See **Verify disk space via the tablet interface**.

To check disk storage space:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin or operator.
3. Check the **Internal Storage** section at the bottom of the menu column. The bar will be mostly green if there is lots of space left, or mostly red if storage space is nearly full.





4. If available storage is low, take action to remove files as discussed in File Maintenance and File and Recording Transfer.

Schedule disk check

A disk maintenance schedule is used to check the device storage drives for errors. Two values are supplied, one to specify the number of system restarts that should occur before disk check, and the second to specify the number of months before performing a disk check. The disk check happens based on whichever event occurs first.

For example, the restart setting is set to 50 and the months setting is set to 6. If six months pass and less than 50 restarts happened, a disk check will occur on the next restart. However if you do 50 restarts in one month, the disk check will happen after the fiftieth restart.

Disk check occurs during start up and can cause a lengthy delay in starting up the device.

To set the disk check schedule:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
4. Set the **number of restarts to occur before the next check**. Set to 0 if you don't want to force a disk check after a specific number of restarts.
5. Set the **number of months to pass before the next check**. Set to 0 if you don't want to force a disk check after a specific number of months.
6. Click **Save**.

Perform disk check

A disk maintenance schedule is used to periodically check the device storage drives for errors. If you prefer, you can run the disk check manually at a time that is convenient for you.

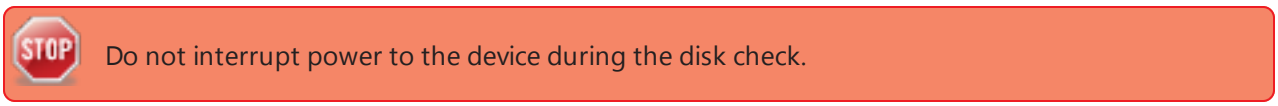
Running the disk check manually resets the timers for the scheduled disk check (i.e. next check won't happen automatically until either the number of restarts or months passes).

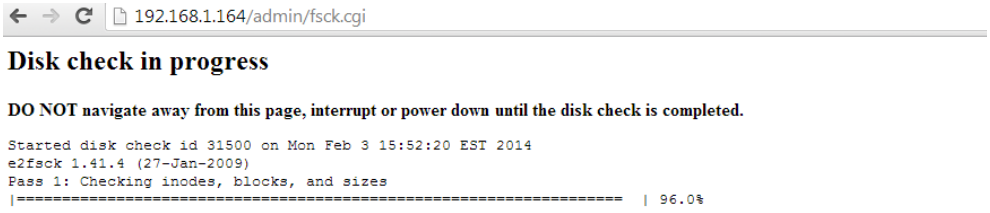
If the device is recording when you start a disk check, it will stop recording and resume after the check is complete. Frames presented during the disk check are not captured and are not part of any recording.

To start a manual disk check:

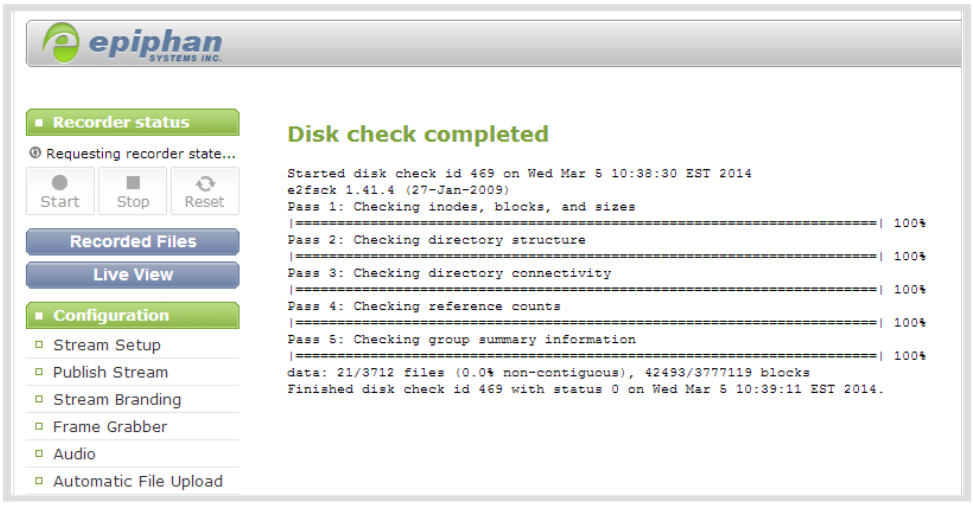
1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.

2. Login as admin.
3. Select the **Disk Check** link in the Configuration menu; the disk maintenance page opens.
4. Click the **Check Now** button; a new page opens showing you the progress of the disk check.





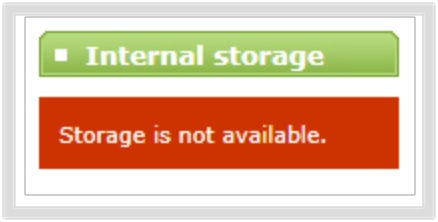
5. When the disk check is complete, the main page returns and a summary is shown.



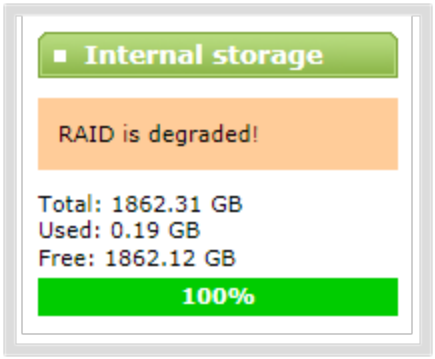
6. If any unrecoverable errors are detected, contact Epiphan support.

    b. If two or more drives are detected, you are prompted to select a type of **RAID array**.

1. Scroll to the Internal Storage section at the bottom of the menus on the left side of the page.
2. If the RAID configuration is sound, the internal storage section reports statistics for the storage, but shows no errors.
3. If using RAID 0 and one of the disks is down, the following error is displayed. Rebuild the disks to recover.



4. If using RAID 1 and one of the disks is down, the following warning is displayed.



7-7 Control with RS-232 / Serial Port

The Lecture Recorder x2 presents an RS-232 / serial port control interface for integration with existing control room and board room equipment. This section covers the following topics:

- Connect and Configure the RS-232 cable
- Control the Lecture Recorder x2 with RS-232
- RS-232 / Serial Port Command Examples

Connect and Configure the RS-232 cable

To connect your control equipment to the Lecture Recorder x2 you will need a standard RS-232 null-modem cable and a USB to RS-232 serial adapter cable. Adapter cables are not included with the Lecture Recorder x2. Only certain adapter chipsets are supported, Epiphan recommends this **adapter cable**.

To connect the serial port cable:

1. Attach the null modem cable to the control interface.

The only configuration available for the serial port is flow control. Flow control changes the rate of data transfer over the cable. Some communication settings are static and cannot be changed. The static settings are:

- Baud rate set at 19200
- Parity set to none
- Stop bits set to one

To configure serial port flow control:

1. Connect to the admin interface using your preferred connection mechanism. See Connect to the Admin Interface.
2. Login as admin.
3. Select the **Serial Port** link in the Configuration menu; the serial port configuration page opens.
4. Select **Hardware**, **Software**, or **None** from the drop-down menu. Refer to the table below for a description of the options.

Table 27 *Serial Port Flow Control Options*

Label	Description / Options
Hardware	A hardware handshake mechanism is used for flow control. This is also called RTS / CTS flow control. Select this when your control terminal requires it (see control terminal manual).

Label	Description / Options
Software	A software handshake that uses XON/XOFF characters to control the flow of data. Select this when your control terminal requires it (see control terminal manual).
None	No flow control is used. Only select this if your control terminal requires it (see control terminal manual).

5. Click **Apply**.

Control the Lecture Recorder x2 with RS-232

You can use the null-modem cable and your control terminal software to issue commands to the Lecture Recorder x2 such as when to start or stop recording, or to retrieve or set the value for various settings.
Note: A line feed (ASCII code 10) is needed at the end of each command.

The table describes the RS-232 commands supported by the Lecture Recorder x2.

Table 28 *Supported RS-232 Commands*

Command Name	Description
Recording Commands	
START	Starts recording. If already recording, the current recording file is closed and a new file is started.
STOP	Stops recording.
SNAPSHOT	Takes a snapshot image (supported only if configured to use the Motion JPEG codec). Snapshots are saved with recording files on the device.
Configuration Commands (see Configuration Keys for Third Party APIs for available keys)	
GET.<key>	Gets the saved value of a given parameter.
SET.<key>	Sets the value of a given parameter. The value is not saved until the SAVECFG command is sent.
SAVECFG	Saves the parameters modified by the SET command.
Status Commands	

Command Name	Description
STATUS	Reports the recording status of each channel. Status is one of: • RUNNING • STOPPED • UNINITIALIZED
FREESPACE	Reports the free storage space, in bytes.
RECTIME	Reports the elapsed recording time for the current file on each channel.

Additionally, the device reports its status changes back along the RS-232 connection using the following messages:

Table 29 *RS-232 Status Changed Messages*

Command Name	Description
STATUS.<status>	Provides the status of the recording serviceas one of: • Running • Stopped • Uninitialized The Uninitialized status is sent when there is an internal error. Check the device for more details.

RS-232 / Serial Port Command Examples

The following examples demonstrate how to use some of the RS-232 commands supported by the device. The list of supported SET and GET parameters are found in Configuration Keys for Third Party APIs .

For values with spaces, enclose the value in quotation marks. For empty values, use empty quotation marks with nothing between.

1. To start recording:

```
START
```

2. To stop recording:

```
STOP
```

3. To get the value of the frame size (resolution):

```
GET.framesize
```

4. To set the frame size (resolution), enclose the parameter in quotes to preserve the spaces:

```
SET.framesize="640 x 480"
SAVECFG
```

5. To enable broadcasting audio:

```
SET.audio=on
SAVECFG
```

6. To disable broadcasting audio:

```
SET.audio=""
SAVECFG
```

7-8 Control with HTTP Commands

The Lecture Recorder x2 has an HTTP API interface for configuration and control by a third party application or with a script that sends commands to the device as a series of URLs. This section covers the following topics:

- HTTP Command Syntax
- HTTP Command Examples

HTTP Command Syntax

Control of the Lecture Recorder x2 by HTTP is done by sending commands to one of two URLs and specifying the target configuration item. Syntax for the get and set commands follows.

To Get configuration settings:

http://<address>/admin/**get_params.cgi**?key

To Set configuration settings:

http://<address>/admin/**set_params.cgi**?key=value

Where <address> is the IP address of the device, key is the key for the configuration item being checked or changed (see the list in Configuration Keys for Third Party APIs), and value is the value to set for the configuration item.

Multiple Requests at Once

You can include multiple key/value pairs in a single command by separating the statements with &.

For example, the key for product name is product_name and the key for firmware version is firmware_version. To send a request for both the product name and the firmware version, use the following command:

http://<address>/admin/get_params.cgi?product_name&firmware_version

Or, to set the stream type (streamtype) to ASF and the bitrate (vbitrate) to 256,000:

http://<address>/admin/set_params.cgi?streamtype=2&vbitrate=256K

Third Party Applications Like wget

If you're using a third party application like wget to send commands to the device, always include the admin username and password when viewing or setting configuration items.

The syntax for wget commands is shown below. Specify your device's IP address, password and the key(s) or value(s) you wish to query. Note your system may require use of single quotes around the password to handle special characters such as exclamation marks.

get_param using wget:

wget --http-user=admin --http-passwd=<password> http://<address>/admin/get_params.cgi?<key>[&<key>]

set_param using wget:

wget --http-user=admin --http-passwd=<password> http://<address>/admin/set_params.cgi?<key>=<value>[&<key>=<value>]

HTTP Command Examples

Some configuration of the VGADVI Broadcaster Pro can be done by non-interactive http commands. The following examples demonstrate how to use wget to exercise some of the HTTP commands supported by the device.

For values with spaces, encode space as %20. i.e.: set_params.cgi?framesize=640%20x%20480

The examples assume a system IP address of 192.30.23.45 and admin password pass123.

1. To get the broadcast stream type and frame size:

wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/get_params.cgi?streamtype&framesize

2. To set the broadcast stream to ASF and at the title "System Stream":

wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/set_params.cgi?streamtype=2&title=System%20Stream

3. To start recording:

```
wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/set_params.cgi?rec_enabled=on
```

4. To stop recording:

```
wget --http-user=admin --http-passwd=pass123 http://192.30.23.45/admin/set_params.cgi?rec_enabled=""
```

7-9 Configuration Keys for Third Party APIs

Using HTTP or RS-232, you can send commands to the device to query or configure the device. For the RS-232 and HTTP syntax see Control with RS-232 / Serial Port and Control with HTTP Commands.

When setting keys to values with spaces use the following syntax.

For RS-232:

Enclose in quotes: SET.2.framesize="640 x 480"

For HTTP:

Encode each space as %20: set_params.cgi?framesize=640%20x%20480

The following sections describe the API keys supported by the device in each of these categories:

- System-level Settings Keys(Read-only)
- System-level Settings Key (Read/Write)
- Recording Configuration Keys
- Configuration Keys for Third Party APIs
- IP-Based Access Control Configuration Keys
- UPnP Configuration Keys
- Frame Grabber Configuration Keys
- Broadcast Configuration Keys
- Channel Encoder Configuration Keys
- Channel Logo Configuration Keys
- Channel Layout Configuration Keys
- Audio Configuration Keys
- Stream Publishing Configuration Keys
- Configuration Keys for Third Party APIs
- RTP/UDP Configuration Keys (Publish Type 3)
- MPEG-TS Configuration Keys (Publish Types 4 and 5)
- Content Metadata Configuration Keys

The list of supported keys is also available for viewing from your device. Browse to the following URL (where <address> is the IP address of the device):

```
http://<address>/admin/http_api.cgi
```

System-level Settings Keys(Read-only)

The following read-only system-level setting keys are supported. The channel number can be omitted from the command when requesting the value for these keys.

Table 30 *Supported Read-Only System-level Settings Configuration Keys*

Key	Values	Description
firmware_version	String, including the text FIRMWARE_ VERSION=.	The device's firmware version. The value is read-only.
mac_address	String	The device's mac address. Useful for debugging. The value is read-only.
product_name	String	The product's name. Useful to confirm you are communicating with the right product or for debugging purposes. The value is read-only.
vendor	Epiphan Systems Inc.	Name of the vendor. The value is always "Epiphan Systems Inc.". The value is read-only.

System-level Settings Key (Read/Write)

The following read/write system-level setting keys are supported. The channel number can be omitted from the command when requesting the value for these keys.

Table 31 *Supported Read/Write System-level Settings Configuration Keys*

Key	Values	Description
frmcheck_ enabled	on empty string ("")	Enables or disables automatic firmware update checking. To enable firmware update checking, set to on. To disable firmware update checking, set to an empty string ("").

Recording Configuration Keys

The following recording settings are supported.

Table 32 *Supported Recording Configuration Keys*

Key	Values	Description
rec_enabled	on empty string ("")	Enables or disables recording. To enable recording, set to on. To disable recording, set to an empty string ("").
rec_format	avi mov ts	Specifies the format of the saved file.
rec_prefix	string	Specifies a prefix for the recording files.
rec_sizelimit	integer	Specifies the file size limit, in kilobytes (kB).
rec_stop_if_no_signal	on empty string ("")	Specifies whether the recording should stop if no signal is detected. To auto-stop when no signal, set to on. To continue recording even if there is no signal, set to an empty string ("").
rec_timelimit	integer	Specifies the time limit, in seconds, before a new recording file is created.

HTTP Server Configuration Keys

The following settings are supported for configuration of the HTTP server run by the device.

Table 33 *Supported HTTP Server Configuration Keys*

Key	Values	Description
http_port	integer	Specifies the HTTP server port.
http_sport	integer	Specifies the HTTP server SSL port (HTTPS port).
http_usessl	integer	Enables or disables HTTPS (SSL Server) To enable SSL, set to on. To disable SSL, set to an empty string ("").

IP-Based Access Control Configuration Keys

The following settings are supported for configuring allowed and denied IP addresses for the device. See Configure Network Settings for more information on Allow and Deny lists.

Table 34 *Supported IP-Based Access Configuration Keys*

Key	Values	Description
allowips	string: comma-separated list of IP addresses and/or ranges. empty string("")	Specifies the IP addresses to permit access. To restrict access, provide a list of permitted IP addresses. To clear allowed IP restriction, set to an empty string ("").
denyips	string: comma-separated list of IP addresses and/or ranges. empty string("")	Specifies the IP addresses to deny access. To restrict access, provide a list of denied IP addresses. To clear denied IP restriction, set to an empty string ("").

UPnP Configuration Keys

The following settings are supported for UPnP streaming.

Table 35 *Supported UPnP Streaming Configuration Keys*

Key	Values	Description
share_archive	on empty string ("")	Enables sharing of recorded files via UPnP. To enable sharing files over UPnP, set to on. To disable sharing files over UPnP, set to an empty string ("").
share_livestreams	on empty string ("")	Enables sharing of the live stream via UPnP. To enable stream sharing over UPnP, set to on. To disable stream sharing over UPnP, set to an empty string ("").
server_name	string	Specifies the UPnP server name. To use the device name, set to an empty string ("").

Frame Grabber Configuration Keys

The following configuration settings are supported by the device. See Configure a video sourcefor more information on each variable.

Table 36 Supported Frame Grabber Configuration Keys

Key	Values	Description
gain	0...255	Specifies ADC gain adjustments. 0 is brightest, 255 is darkest.
hshift	-999...999	Specifies horizontal shift. For shifts to the left, use positive values. For shifts to the right, use negative values.
offset	0...63	Specifies ADC offset. 0 is brightest, 63 is darkest.
phase	0...31	Specifies phase adjustments for VGA signals. Generally not used unless value is provided by Epiphan support.
pll	-999...999	Specifies PLL adjustment. Changes the number of pixels in the line.
tune_interval	0...9999	Specifies the number of auto-adjustments in the interval. To disable auto-adjustments, set to 0.
vshift	-20...20	Specifies vertical shift. For shifts up, use positive values. For shifts down, use negative values.

Broadcast Configuration Keys

The following broadcast configuration settings are supported.

Table 37 Supported Broadcast Configuration Keys

Key	Values	Description
bcast_disabled	on empty string ("")	Enables or disables the broadcast. To disable broadcast, set to on. To enable broadcast, set to empty string ("").
rtsp_port	1000...65535, but not 5557	Specifies the port for RTSP streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
streamport	1000...65535, but not 5557	Specifies the port used for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

Channel Encoder Configuration Keys

The following channel encoder configuration settings are supported. For more information on individual items listed, see Configure channels.

Table 38 *Supported Channel Encoder Configuration Keys*

Key	Values	Description
autoframesize	on empty string ("")	Enables or disables use of the current signal's resolution as the frame size. Is switched to off if a frame size is manually specified. To use current signal's frame size, set to on. To specify frame size directly, set to empty string ("").
codec	h.264 mpeg4 mjpeg	Specifies the stream codec.
fpslimit	1-30	Specifies the frame per second limit. Set to your desired limit.
framesize	640 x 480 720 x 400 720 x 480 720 x 576 768 x 576 1024 x 768 1152 x 864 1280 x 720 1280 x 768 1280 x 960 1280 x 1024 1360 x 768 1360 x 1024 1600 x 1200 1920 x 1200	Specifies the frame size in pixels. Set to desired size, refer to description above on handling white space in the value.
nosignal	on filename empty string ("")	Enables or disables the "No Signal" message if no signal is found. To use the default no signal message, set to on. To use a custom no signal message, specify the filename (file must already be uploaded to the device). To disable the no signal message, set to empty string ("")

Key	Values	Description
timelabel	none (no date) date (date alone) hms (time alone) date_hms (date and time) hms_ms (time to ms) date_hms_ms (date and time to ms)	Specifies the time label on the stream. To have no time label, set to 'none'.
slicemode	on empty string ("")	Enables or disables h.264 slicing for RTP. To enable slicing, set to on. To disable slicing, set to empty string ("").
vbitrate	Integer integerK (i.e. 64K) integerM (i.e. 1M)	Gets or changes the video bit rate in kbit/s. Short forms such as 64K or 1M can be used.
vbufmode	1 (low delay) 2 (storage)	Specifies the broadcast compression level. For low delay when streaming, specify 1. For best results or recording, set to 2.
vencpreset	0 (default) 1 (High quality) 2 (High speed)	Specifies a video encoding preset. For the default (balanced) setting, set to 0. To prioritize quality over speed, set to 1. To prioritize speed over quality, set to 2.
videosource	string	Video source string for multi-channel devices.
vprofile	66 77 100	Specifies the h.264 video profiles. For Baseline profile, select 66. For Main profile, select 77. For High profile, select 100.
qvalue	0...100	Specifies quality for M-JPEG videos.

Channel Logo Configuration Keys

The following options are supported for querying or modifying channel logo settings.

Table 39 *Supported Channel Logo Configuration Keys*

Key	Values	Description
logo_margin_x	0...frame width	Specifies the horizontal offset in pixels from the position in logo_position. To offset 10 pixels from the left (when using a top-left logo position), set to 10.
logo_margin_y	0...frame height	Specifies the vertical offset in pixels from the position in logo_position. To offset 20 pixels from the top (when using a top-left logo position), set to 20.
logo_position	lt lb rt rb	Specifies the logo position on the screen (prior to tweaks from margins x and y). To have the logo at the left-top, set to lt. To have the logo at the left-bottom, set to lb. To have the logo at the right-top, set to rt. To have the logo at the right-bottom, set to rb.
logo_src	string	Specifies the logo source file name. The file must already be uploaded to the device.

Channel Layout Configuration Keys

The following settings are supported to configure multi-source streams. For more information see Configure picture in picture or picture with picture layout.

Table 40 *Supported Channel Layout Configuration Keys*

Key	Values	Description
bgcolor	string (format: RRGGBB)	Specifies the background color for video outside the picture in picture modes.
pip_layout	0 (independent streams) 1 (video to left and inside vga) 2(video to right and inside vga) 3 (video to left and outside vga) 4 (video to right and outside vga)	Specifies the kind of picture in picture layout to use. See Configure picture in picture or picture with picture layout for examples of the different modes.

Audio Configuration Keys

The following audio configuration keys are supported. For more information on individual items listed, see Configure channels.

Table 41 *Supported Audio Configuration Keys*

Key	Values	Description
audio	on empty string ("")	Enables or disables audio for the stream. To enable audio, set to on. To disable audio, set to an empty string ("").
audiochannels	1 (mono) 2 (stereo)	Specifies the number of audio channels. For mono, set to 1. For stereo, set to 2.
audiopreset	CODECS: pcm_s161e (PCM) pcm_alaw (G.711 a-law) pcm_mulaw (G.711 u-law) libmp3lame (MP3) libfacc (AAC) RATES: 32 64 96 112 128 160 192	Specifies an audio code preset in the format CODEC;RATE. i.e. libfaac;128

Stream Publishing Configuration Keys

The device supports the following stream publishing settings. For more information on publishing the stream, see Stream your video.

Table 42 *Supported Stream Publishing Configuration Keys*

Key	Values	Description
publish_type	0 (do not publish) 1 (via Epiphan.tv) 2 (RTSP Announce) 3 (multicast RTP/UDP) 4 (multicast MPEG-TS over UDP) 5 (multicast MPEG-TS over RTP/UDP) 6 (RTMP push)	Specifies the type of stream publishing, if any.

RTSP Announce Configuration Keys (Publish Type 2)

The following settings are supported when the publish type is set to RTSP Announce. For more information on RTSP and these settings, see Stream your video.

Table 43 *Supported RTSP Announce Configuration Keys*

Key	Values	Description
announce_by_tcp	on empty string ("")	Enables or disable RTSP over TCP. To enable TCP transport, set to on. Otherwise, set to empty string ("").
announce_host	string	Specifies the RTSP server address. Set to the appropriate IP address.
announce_name	string	Specifies the RTSP resource name.
announce_password	string	Specifies the password for the RTSP server's user.
announce_port	1000...65535, but not 5557	Specifies the RTSP server port to connect to for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
announce_username	string	Specifies the username for the RTSP server. Value is provided by the RTSP server.

RTP/UDP Configuration Keys (Publish Type 3)

The following settings are supported when the publish type is set to RTP/UDP. For more information on RTP/UDP and these settings, see Stream your video.

Table 44 *Supported RTP/UDP Configuration Keys*

Key	Values	Description
unicast_address	string (IP address)	Specifies the unicast/multicast address.
unicast_aport	1000...65535, but not 5557	Specifies the UDP port for RTP/UDP audio streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
unicast_vport	1000...65535, but not 5557	Specifies the UDP port for RTP/UDP video streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

MPEG-TS Configuration Keys (Publish Types 4 and 5)

The following settings are supported when the publish type is set to MPEG-TS. For more information on MPEG-TS and these settings, see Stream your video.

Table 45 *Supported MPEG-TS Configuration Keys*

Key	Values	Description
unicast_address	string (IP address)	Specifies the unicast/multicast address.
unicast_mport	1000...65535, but not 5557	Specifies the UDP port for MPEG-TS streaming. Note port 5557 is used for network discovery and cannot be used for streaming.

RTMP Push Configuration Keys (Publish Type 6)

The following settings are supported when the publish type is set to RTMP Push. For more information on RTMP and these settings, see Stream your video.

Table 46 *Supported RTMP Annouce Configuration Keys*

Key	Values	Description
announce_host	string	Specifies the RTMP server address. Set to the appropriate IP address.

Key	Values	Description
announce_name	string	Specifies the RTMP resource name.
announce_password	string	Specifies the password for the RTMP server's user.
announce_port	1000...65535, but not 5557	Specifies the RTMP server port to connect to for streaming. Note port 5557 is used for network discovery and cannot be used for streaming.
announce_username	string	Specifies the username for the RTMP server. Value is provided by the RTMP server.

Content Metadata Configuration Keys

The following keys are available for configuration of the content's metadata.

Table 47 *Supported Content Metadata Configuration Keys*

Key	Values	Description
author	string	Specifies the name of the author for the broadcast video. Refer to description above on handling white space (spaces) in the string.
comment	string	Specifies a comment for the broadcast video. Refer to description above on handling white space (spaces) in the string.
copyright	string	Specifies the copyright for the broadcast video. Refer to description above on handling white space (spaces) in the string.
title	string	Specifies the title for the broadcast video. Refer to description above on handling white space (spaces) in the string. (This string can be displayed by certain viewing applications by looking at the stream's metadata information.)

7-10 Troubleshooting

Use the follow table for help if you are experiencing problems or unexpected behavior from your Lecture Recorder x2.

Problem	Action(s) to Resolve
Not sure if the connected video inputs are being captured.	Look at the device's LED lights. If the red light is blinking, signal is being received. OR Check each source's input from the source preview in the Web Interface. See Configure a video source.
No sound is coming from an audio source.	Verify that you are using the correct audio input by following the steps in Configure an audio source.
Too much noise is present in the audio output.	Modify the **Input Amplifier Volume** parameter in the Audio menu. Start with setting it to 40% and reduce until the noise is no longer present. See Set audio volume for details on this setting.
Image quality is poor or insufficient.	The following tips can help improve image quality: 1. Ensure the source resolution is used as the output or recorded resolution. Up-scaling and down-scaling can affect picture quality. See Upscale or downscale your video image. 2. Increase the **Bitrate** value and/or decrease the **Limit frame rate** value in the Stream Setup menu. See Adjust video quality .
Frames per second are lower than expected.	The following tips can help improve frames per second (fps): 1. Increase **the Limit frame rate** value and/or decrease the **Bitrate** value in the Stream Setup menu. See Adjust video quality . 2. Reduce the number of actions happening simultaneously on the device (i.e. if streaming, recording, and copying files, consider waiting to copy files until after streaming and recording are complete). 3. Enter a low negative value (i.e. -5) in the Frame Grabber's Vertical Shift field.

Problem	Action(s) to Resolve
Stream won't play in my media player or browser.	Check the LEDs on the System to ensure data is being recevied. The green LED should be illuminated and the red LED blinking. If the broadcast is being recorded, the blue LED blinks too. Verify that the Stream Type matches with the media player used and that you have the correct url or SDP file for the player. See Viewing with a web browser and Viewing with a media player. If you still cannot see the stream, try disabling your local computer firewall. If the issue is still not resolved, contact Epiphan Support at **support@epiphan.com**.
The stream interrupts or the image breaks up.	The following tips can help diagnose image problems: 1. Ensure the source resolution is used as the output or recorded resolution. Up-scaling and down-scaling can affect picture quality. See Upscale or downscale your video image. 2. Increase the **Bitrate** value and/or decrease the **Limit frame rate** value in the Stream Setup menu. See Adjust video quality . 3. Check network settings including filters, routers and application settings. Packet loss can result in stream failure.
Recording issues.	If recording will not start, check the Disk Status Information to see if the device is out of disk space. See Check disk storage space and File Maintenance.
Firmware upgrade fails.	Reboot the device and try again. If the problem persists, contact Epiphan support at **support@epiphan.com**.

PART 8: Releases and Features

This section outlines the features introduced with each product release.

Release 3.11 Features

Improved USB Drive Support

Choose what happens when you insert a USB drive

You can now select what happens when you insert a USB drive: nothing; a one-time copy or transfer to the drive; a manual copy or transfer to the drive; or automatic continuous copy or transfer of recorded files to the drive.

Additionally, the Web Interface now shows you the available free space on your inserted USB drive.

Record directly to a USB drive (VGADVI Recorder)

With VGADVI Recorder (only), you can now choose to record files directly to your attached USB drive rather than recording to internal storage. A confidence-monitoring system shows you a read-only list of the recordings on the USB drive.

Automatic file upload to a USB drive

As of 3.11.0, you can configure the device to automatically upload recorded files to an attached USB drive. Choose to either have it work the same way as uploading via FTP, CIFS, or RSYNC; or as a one-time download of all the recordings on the device.

Wider support for USB flash drives

Previously some USB drives were not supported due to disk partitioning. Lecture Recorder x2 now supports USB drives with non-typical data partitions. When the USB drive is attached, the first partition with a supported file system is used for data storage.

See Upload to an External USB Drive.

Audio Features

Audio input level meter

Audio inputs that have an incoming signal and are part of a configured stream now have an audio signal level meter on the stream information page.

The new mobile interface also displays the audio input level meter.

Auto Settings

Automatic selection frame size using signal resolution

To assist with stream setup, stream frame size is now configured by default with the input signal's resolution and will follow the signal's changes of resolution.

If the input signal changes, streaming and recording is stopped and restarted. Deslect **Use current signal resolution as frame size** if your input resolution will change often and you don't want streaming or recording to stop and restart with each change.

Automatic video bitrate selection

Based on the video encoder type, source resolution and stream frame size, the device now automatically calculates a suggested bitrate that provides the best performance and quality trade off.

Examples for H.264:

- 640×480, 15 fps, - 1.4 Mbps
- 1280×720, 20 fps - 2.6Mbps
- 1920×1080, 30 fps - 6.5 Mbps

Preservation of source aspect ratio

A new feature, enabled by default, makes sure that the aspect ratio of input signals is preserved when encoded and streamed. If an input video signal doesn't match the encoding ratio, a matte is applied and bars are visible at the sides or top and bottom of the encoded stream. The color of the matte is customizable.

Universal Plug and Play (UPnP)

Device as a media controller

Enjoy the new live stream resume feature to ensure a digital media player automatically gets the stream when it becomes available after the Lecture Recorder x2 restarts. Simply choose a stream and the UPnP-enabled media player to control.

See Stream content using UPnP.

Play on digital media players from the web interface

Direct your digital media player to play a recorded MPEG-TS files from the device. Browse to the Files Archive and press the play button to choose from accessible uPnP media players.

See Stream content using UPnP.

Mobile and Tablet Features

Introducing the mobile / tablet operator interface

Use your mobile device or tablet for confidence monitoring of channels, streams and audio levels. You can now start and stop recordings from an interface designed for a touch-screen device. Point your smartphone or tablet to http://<device IP address>/admin/m.

See Mobile / Tablet Operator Interface.

Discovery of Epiphan devices

Use the new Epiphan Connect application on Android and iOS as an alternative to the desktop based discovery utility. The application has built-in support for opening the tablet operator interface and can be configured to automatically open the tablet interface if connected to the Lecture Recorder x2 by USB.

Mobile tethering

Release 3.11.0 introduces the option to use mobile tethering for recording control, confidence monitoring and mobile network file transfers. Configure mobile data tethering and turn on automatic file uploads to automatically transfer files to a remote site using the public mobile network. Alternatively, choose to tether for confidence monitoring and recording control only.

Configure the Lecture Recorder x2 to use no mobile data, to use Ethernet normally and switch to mobile data if the Ethernet becomes unavailable, or to mobile data as the preferred transmission method.

Other Improvements:

- Starting with release 3.11.0, you can **customize the prefix used for recorded files**. Use this to identify files being auto-uploaded from various rooms at a conference, or to keep track of which source is being recorded. See Configure the type and length of recording files
- Customize the buttons on your Lecture Recorder x2. **Select the action for the two buttons on the front of the device**, and for attached USB mouse or keyboards.
- Inputs that have an incoming signal and are part of a configured channel can be **previewed on the Stream Setup** page. A static screenshot is shown and can be updated manually by clicking reload screenshot.
- **Encode SVideo input without DVI or VGA input**. You can now enable or disable the VGADVI input on your Lecture Recorder x2. When disabled the S-Video input will be the only source used for the resulting stream. By default VGADVI is enabled, and it is always the primary input if both inputs are enabled. Disable it from the **Stream Setup** page.
- **MPEG-TS format recording**. This robust encoding mechanism has no index or trailer structures making it the most fault tolerant format supported by the Lecture Recorder x2. MPEG-TS files are ready for streaming over HTTP, RTP and UDP.
- Ensuring **multiple sources are synchronized and time-stamped precisely** is easier than ever. with support for PTP time synchronization.
- H.263 (an older Flash implementation) is replaced with MPEG-4. As of Flash Player 9, update 3 (in December 2007), Flash supports H.264 encoding. If H.264 does not suit your needs, you can still support older players with the MPEG-4 codec. The exact codec supported is MPEG-4 Advanced Simple Profile.

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March 28, 2014

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